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ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Chemical Studies on Shark Meat (IV).

Studies on the Isoelectric Behavior and Absorption
Spectrum of Shark Meat Protein.

(pp. 1~6)

By Kinsuke KONDO and Tadao HATA.

(Nutritional Chemical Laboratory, Department of Agriculture, Kyoto Imperial University;
Received August 28, 1941.)

Chemical Studies on Shark Meat (V).

Studies on the Absorption Spectrum of Shark Meat Protein.

(pp. 7~14)

By Hisateru MITSUTA.

(Nutritional Chemical Laboratory, Department of Agriculture, Kyoto Imperial University;
Received September 1, 1941.)

Untersuchungen über das sogenannte „Gluconobacter.“

V. Mitteilung.

(SS. 15~26)

Von Teijirô UYEMURA und Keiji KONDÔ.

(Wissenschaftl. Laboratorium von Ch. Takeda und Co. Ltd., Osaka:
Eingegangen am 28. 4. 1941.)

**Study of the Insecticidal Principle in the Smoke
Produced by Combusting Insect
Powder. (Part VII).**

(pp. 27~34)

By Makoto NAGASE.

(Agricultural Chemical Department, Taihoku Imperial University, Taiwan;
Received October 25, 1941.)

Digestibility of Acorns Fed to Poultry and Rats.

(pp. 35~40)

By Hisayoshi IWATA and Ryosuke KIKUCHI.

(Morioka Imperial College of Agriculture and Forestry;
Received September 17, 1941)

The digestibility coefficient of the shelled and crushed acorns fed to cocks and hens was found to be about 71% (organic matter) and about 74% (nitrogen free extract). In the case of the tannin treated acorns eaten by rats, the coefficient increased to 84 and 88% respectively.

**A Method for the Determination of Sulfhydryl-
Radical in Protein.**

(pp. 41~46)

By Shigeki MORI.

(Kondo Laboratory, Institute for Chemistry, Kyoto Imperial University;
Received November 12, 1941.)

**Untersuchungen über die Peptonisierung des
Sojabohneneiweißes (I)**

Der Einfluß des Dispersionszustandes des Substrates
auf die Pepsinverdauung des Sojabohneneiweißes.

(pp. 47~53)

Masaru HUNATZU.

(Ableitung der Agrikulturchemie, Zentrallaboratorium, S. M. R. Co., Dairen;
Eingegangen am 1. November 1941.)

Der Dispersionszustand des Sojabohneneiweißes in Salzsäurelösung hängt vom pH ab.

Die maximale Dispersität des Sojabohneneiweißes in der Lösung liegt bei pH 2, während die Dispersität abnimmt wenn die Wasserstoffionenkonzentration höher oder niedriger als pH 2 ist.

Dieser Vorgang steht mit dem Zusammenhang zwischen pH und der Verdauungsgeschwindigkeit bei der Pepsinverdauung desselben Eiweißes gut in Einklang.

Läßt man die Dispersität des Substrates auf Zusatz von NaCl vermindern, so nimmt die Verdauungsgeschwindigkeit des Pepsins parallel ab.

Aus dem oben erwähnten Versuchsergebnis folgt, daß die Verdauungsgeschwindigkeit bei der Pepsinverdauung des Sojabohneneiweißes der Dispersität des Substrates proportional ist.

Studies on the Synthetic Nitrogenous Fibers. (Part 1)

(pp. 54~50)

By Syuiku SASAKI and Masato MIYAUTI.

(Sericultural Chemical Institute, Department of Agriculture, Kyushu Imperial University;
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On the Slightly Podzolized Brown Forest Soil in Teturei Prefecture, North-Manchuria.

(pp. 59~62)

By R. KAWASHIMA.

(Agr. Chem. Laboratory, Kyushu Imp. University; Received November 10, 1941)

Functional Studies on Soils. (47~52).

(pp. 63~74)

By MISU-Hideo.

(Agricultural Experiment Station, Government General of Tyosen;
Received September 12, 1941.)

On the Biochemical Properties of the Rice Embryo. (Part 2).

(pp. 75~76)

By T. TADOKORO and J. HASHIMOTO.

(Hokkaido Imperial University; Received August 30, 1941.)

On the Biochemical Properties of Tomato and Potato Viruses.

(pp. 77~80)

By Tetutarô TADOKORO, Tuneyuki SAITÔ,
and Naomoto TAKASUGI.

(Hokkaido Imperial University; Received August 11, 1941.)

Synthese von Vitamin B₆ durch Hefe.

(SS. 81~89)

Von Tyoten INAGAKI und Kiyoko NAGAO.

(Lebensmittelchemisches Forschungsinstitut der Meiji Zuckerindustrie:
Eingegangen am 28. Okt. 1941.)

Es wurden Untersuchungen über die Fähigkeit der Hefen (Bier-, Alkohol-, Oriental- und Sake-Hefe) ausgeführt, die Vitamin B zu synthetisieren. Wenn man die Hefe längere Zeit unter sehr häufigem Überimpfen in einer absolut vitaminfreien Nahrlosung züchtet, die einige mineralische Nährsalze und Zucker enthält, werden die Vitamin B₆, B₁ und B₂ im Hefenkörper in folgenden Verhältnissen synthetisiert:

| | | |
|-----|--|-----------------------|
| | Vitamin B ₆über 20 γ | je 1 g Trockenhefe, |
| | Vitamin B ₁14 bis 25 γ | je 1 g Trockenhefe, |
| und | Vitamin B ₂etwa 1000 γ | je 100 g Trockenhefe. |

Wie verfütterten die auf diese Weise erhaltene Hefe an Vitamin-B₆ (oder B₁) frei ernährte Ratten, welche sofort nach der Hefezugabe ein sehr kraftiges Wachstum zeigten.

Einige Beispiele der Analyse von Trockenhefe wurden auch gegeben.

On the Metabolism of Organic Acid by Bacteria. V.

(pp. 90~94)

By S. TADA.

(Agricultural Chemical Laboratory, Tokyo Imperial University;
Received October 29, 1941.)

On the Potentiometric Determination of Chlorine by the Pinkhof System.

(pp. 95~105)

By Sadaji FURUTANI.

(Agricultural Chemical Laboratory, Kyūshū Imperial University, Hukuoka ;

Received October 20, 1941.)

1. A rapid potentiometric method has been devised, modifying the Pinkhof system. Using $N/100$ AgNO_3 , determinations of chlorine have been made in the following materials: common salt, hydrochloric acid, sea water, tap water, soil, fish cake, blood powder, urine, milk, saliva, shōyu (Japanese sauce), etc.

2. As a reference electrode, the quinhydrone electrode in $N/100$ acetic acid, which is easy to prepare, has been satisfactorily employed, the potential of which is almost equal to that of the silver electrode in saturated silver chloride solution at 20°C . The capillary electrometer with enough sensitivity has been used as a zero-instrument.

3. Previous to the titration, by adding 1 cc of $N/10$ HNO_3 per 10 cc of a sample solution diluted depending on its chlorine content, the unfavourable influence of organic matters on the determination can be easily eliminated. This contradicts Plücker's experiment⁽¹⁾ showing that the occlusion of chlorine ion in the protein coagulate takes place on acidifying sample solution such as milk.

4. The present method gives the same results as obtained by the methods of Mohr, Volhard, Rusznyák and the so-called potentiometric titration (compensation method).

(1) W. Plücker: *Z. Untersuch. Lebensm.*, **60** (1930), 109.

Studies on Ascorbic Acid. V.

The Relation between Ascorbic Acid and Thiamin. I.

(pp. 106~110)

By Kichinosuke FUJIMURA.

(Laboratory of Nutritional Chemistry, Dept. of Agricultural and
Chemical Institute, Kyoto Imperial University ;

Received October 14, 1941.)

Über die Alkalität der Asche von *Sasa* (*Sasa paniculata* MAKINO et SHIBATA)

(SS. 111~115)

Von Eiji TAKAHASHI, Nobuo ITO, und Ryozo KAKUWA.

(Institut für Landwirtschaftliche Chemie, Landwirtschaftliche Fakultät der Kaiserlichen Hokkaido Universität; Eingegangen am 19. 11. 1941.)

Um den Einfluss der in *Sasa* reichlich gefundenen Kieselsäure auf die Alkalität der Asche von dieser Futterpflanze zu bestätigen, wurde zweierlei Alkalität nach den Aschenanalysendata wie folgt gerechnet.

Alkalität A.....Kieselsäure wurde berechnet als neutral.

Alkalität B.....Kieselsäure wurde berechnet als sauer.

Anderseits wurde die Alkalität C der Asche praktisch nach der Titrationsmethode bestimmt. Da C nach dem Ergebnisse zwischen A und B lag, musste wahrscheinlich nur ein Teil der Kieselsäure sauer wirken. Es wurde das Verhältnis der sauerwirkenden Kieselsäure zu dem ganzen Kieselsäuregehalt in den verschiedenen Perioden berechnet; in der Sprossenperiode war es grösser als 1, es war nämlich unmöglich, die Alkalität zu kompensieren, wenn man auch das Ganze der Kieselsäure als sauer annahm, aber in den Blättern und im Stengel waren diese Verhältnisse so klein und verschieden nach den Perioden, wie folgt.

| | Blätter | Stengel |
|---------|---------|---------|
| Juli | 0.18 | 0.25 |
| August | 0.26 | 0.18 |
| Oktober | 0.11 | 0.33 |

Wenn *Sasa* dem Haustiere verfüttert wird, frisst dieses nicht nur die Blätter, sondern auch einen Teil des Stengels, was die Autoren zur Annahme führt, dass durchschnittlich ca. 20% der in *Sasa* gefundenen Kieselsäure als sauer wirkt.

Die alkoholösliche organische Kieselsäure war in jeder Periode sehr gering in *Sasa* und hat somit keinen Einfluss auf die Alkalitätsbestätigung.

Studies on Bios. Part V.

Characters of Varieties of *Saccharomyces cerevisiae*
on the known Ingredients of Bios.

(pp. 116~118)

By Nobusada ŌKOTI.

(Agricultural-chemical Laboratory, Faculty of Agriculture, Tokyo Imperial University;

Received Nov. 7, 1941)

Blätteralkohol. V. Mitteilung.

Zur Kenntnis der katalytischen Hydrierung von dreifacher
Bindung zu Doppelbindung.

(SS. 119~124)

Von Sankiti TAKEI und Minoru ÔNO.

(Aus d. Agrikulturchem. Institut d. Universität Kyoto; Eingegangen am 27. Okt. 1941.)

Wie in unserer letzten Arbeit⁽¹⁾ mitgeteilt wurde, kann man aus Hexin-3-ol-1 durch katalytische Hydrierung bei 100° *cis*-Hexen-3-ol-1, bei -18° dagegen *trans*-Hexen-3-ol-1 gewinnen. Das gleiche gilt von der Hydrierung der Stearolsäure zu Ölsäure (*cis*-Form) bzw. zu Elaidinsäure (*trans*-Form).

Hierauf wollten wir nun untersuchen, ob die oben angegebenen Temperaturbedingungen bei der katalytischen Hydrierung von der dreifachen Bindung zur Doppelbindung auch für andere Verbindungen gelten. Zunächst wurden beim Modellversuch Acetylendicarbonsäure $\text{HOOC}\cdot\text{C}\equiv\text{C}\cdot\text{COOH}$, Phenylpropionsäure $\text{C}_6\text{H}_5\cdot\text{C}\equiv\text{C}\cdot\text{COOH}$ und *p*-Methoxy-phenylpropionsäure $\text{H}_3\text{CO}\cdot\text{C}_6\text{H}_4\cdot\text{C}\equiv\text{C}\cdot\text{COOH}$ genommen. Acetylendicarbonsäure ergab durch 1 Mol. Hydrierung mit Pd-BaSO₄ bei 100° nur Maleinsäure (*cis*-Form) und bei -18° ausser Bernsteinsäure nur den unveränderten Ausgangsstoff, aber nicht die erwartete Fumarsäure (*trans*-Form). Phenylpropionsäure lieferte bei analogen Reaktionsbedingungen einmal die tiefer schmelzende *cis*-Zimtsäure und zum andern die hoher schmelzende *trans*-Zimtsäure. Bei der 1 Mol. Hydrierung des *p*-Methoxy-phenylpropionsäure war der durch die Veränderung der Reaktionstemperatur bewirkte Unterschied sehr gering, und zwar ergab sich immer neben 15~20% *trans-p*-Methoxy-zimtsäure 65~75% *cis-p*-Methoxy-zimtsäure.

Auf Grund unserer fruheren und obigen Ergebnisse darf man wohl annehmen, dass die Verbindungen, die eine derartige dreifache Bindung $-\text{CH}_2\cdot\text{C}\equiv\text{C}\cdot\text{CH}_2-$ besitzen, bei der katalytischen 1 Mol. Hydrierung je nach der höheren oder tieferen Reaktionstemperatur leicht in das *cis*- bzw. *trans*-Doppelbindung haltige Produkt umgewandelt werden können. Die Substanzen, die in der α - oder α' -Stellung einer dreifachen Bindung substituiert werden, wie $-\text{C}\equiv\text{C}\cdot\text{COOH}$ sowie $\text{C}_6\text{H}_5\cdot\text{C}\equiv\text{C}\cdot\text{COOH}$, verwandeln sich ebenfalls nach dieser Regel, doch ist die Tendenz hierzu viel schwacher.

(1) IV. Mitteilung: J. Agr. Chem. Japan, **16**, 772 (1940); B. **73**, 950 (1940.)

Über die Bestandteile der Japanischen Mistel.

V. Mitteilung. Harz- und Fettsäure im Wachs.

(SS. 125~128)

Von Yatarô OBATA.

(Biochemisches Institut der Landwirtschaftlichen Fakultät, Universität Tokio :

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ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Über die Soyabohneneiweißstoffe. II. Mitteilung.

Veränderungen der Gehaltsverhältnisse von Eiweissarten
durch die verschiedene Behandlung der Bohnen.

(SS. 129~135)

Von Kunihiko SUMINOKURA.

(Biochemisches Institut der Tottori Landwirtschaftlichen Hochschule, Tottori:

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Studien über die Fixierung des Sericin. I. Mitteilung.

(SS. 136~142)

Von Z. HIROSE.

(Aus dem Institut für Seidenbau der Aktiengesellschaft Gunze-Seisi zu Ayabe, Kyoto-hu:

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Wir haben folgende Ergebnisse gehabt:

Preßt man vollständig Rohseiden, die mit einer Pufferlösung von pH 1,2~2,5 behandelt wurden, bis zu zirka 40% Lösungsgewicht des Puffers und behandelt sie darauf mit Formaldehydgas von über 60°C., so verbindet sich das Formaldehyd mit den OH-Gruppen des Sericin.

Die Wasserstabilität der so erhaltenen Sericin-Formaldehyd-Verbindung war grösser als diejenige von Mustern, welche auf einer anderen Methode der Formaldehydfixierung beruht. Es versteht sich, daß Sericin an Oxyaminosäure und Monoaminodicarbonsäure reich ist.

The Dehydration of 2,3-Butylenglycol.

(pp. 143~150)

By K. ŌHARA and S. FURUHASI.

(Agr. Chem. Laboratory, Faculty of Agr., Tokyo Imperial University;

Received December 8, 1941.)

On the Form of Sulphur in Soy-bean Protein.

(pp. 151~154)

By Shigeki MORI.

(Kondō Laboratory, Institute for Chemistry, Kyoto Imperial University;
Received November 12, 1941.)**On the Additive Reaction of Sodiumbisulphite
with Crotonaldehyde.**

(pp. 155~165)

By M. HORI.

(Central Research Institute, Japanese Government Monopoly Bureau;
Received December 14, 1940.)**On the Chemical Studies of the Baggasse Pulp. (8~9).**

(pp. 166~174)

By T. TADOKORO and M. NISHIDA.

(Hokkaido Imperial University; Received October 31, 1941.)

Function Studies on Soils. (53~58).

(pp. 175~186)

By MISU-Hideo.

(Agricultural Experiment Station, Government of Tyōsen;
Received September 12, 1941.)**Study of the Insecticidal Principle in the Smoke Produced
by Combusting Insect Powder. (Part VIII.)**

(pp. 187~193)

By Makoto NAGASE.

(Agricultural Chemical Department, Taihoku Imperial University, Taiwan;
Received October 30, 1941.)**On the Amount of Solar Ultra Violet Rays.**Special relation between the variations of solar ultra
violet rays and the types of weathers.

(pp. 194~198)

By Torataro HANZAWA.

(Agricultural Chemical Laboratory, Hokkaido Imperial University;
Received December 4, 1941.)

The intensity of ultra violet rays reaching the surface of the earth was determined by the molybdic method which was formerly devised and published by the author⁽¹⁾.

The constant value, which means the total amount of ultra violet rays rea-

ching the outer atmosphere of the earth at the time of ideal altitude, i. e., 90° of sun, was computed by means of the least square method using the numerical values obtained by actual measurements. When expressed in quantity as hydrogen for the unit area per square centimeter per minute, constant value is 1.2980×10^{-5} g.

The following empirical formula was deduced from the above constant and the results of determinations of ultra violet rays.

$$\log M_0 = \log K - \alpha \cdot \operatorname{cosec} \theta + \log \sin \theta - 2 \cdot \log r$$

In this formula, M_0 is the actual value calculated to the standard semidiameter of the sun from the measured ultra violet intensity M , K is the constant (1.2980), α is the extinction coefficient, r is the ratio of the distance from the sun to the earth, and θ is the solar altitude whose value can be calculated by the ordinary method.

By the application of the formula, the values of the extinction coefficients at any time and day may be easily calculated. After a set of actual measurements on clear days of absolute cloudlessness, but not calm, with rather a gentle wind in velocity of a few meters of E. S. S., and calculations by means of the formula, it was found that there are special relations between the variations of extinction coefficients and weather types.

The extinction coefficients found during several days in the early spring of the year 1932 were comparatively small, but rather a little larger at the period of a little before noon than in the morning. In the year 1933, on the contrary, they appeared much larger in general, but smaller at the noon period than in the morning, showing a good tendency of decreasing towards noon.

The author proposes a hypothesis that if the values and variations of extinction coefficients will appear as in the year 1932, there may be expected a type of weather producing poor harvests of some kinds of agricultural crops, but when they are as in the year 1933, the coming weather type is considered to be suitable for good growth of plants such as rice.

This hypothesis, of course, contains many uncertainties and it should be ascertained by experimental observations of plant growth and the actual determinations of the solar ultra violet rays.

The author has had the opportunity of ascertaining the hypothesis in forecasting the weather type in this year 1941.

According to the experiments, the extinction coefficients were found denoting the poor type with numerical values comparatively small, in mean 0.0099, and standard deviation ± 0.00919 , and the features of the coefficients with the configurations continually decreasing. Therefore, the experiments and observations of harvests were found fairly supporting the hypothesis.

The author asserts the importance of studying the amount of ultra violet rays and of observations for meteorological factors in the northern part of Japan for the purpose of further testing the validity of the hypothesis and establishing the scientific foundations of agricultural and fishery practices.

LITERATURE.

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- (2) T. Hanzawa: Ibid., 644 (1935).

Synthesis of Bios by Aspergilli.

(pp. 199~200)

By Nobusada OKOTI.

(Agricultural-chemical Laboratory, Faculty of Agriculture, Tokyo Imperial University;
Received Nov. 11, 1941.)

**Untersuchungen über das sogenannte
„Gluconobacter.“ VI. Mitteilung.**

Über das sogenannte „Eugluconofacter“

(SS. 201~206)

Von Teijirō UYEMURA, Keiji KONDŌ, und Reizirō KODAMA

(Wissenschaftl. Laboratorium von Ch. Takeda u. Co. Ltd., Osaka.
Eingegangen am 26. 11. 1941.)

Biochemical Studies of “Bakanae” Fungus. Part 14.

Effect of Gibberellin A on Tissue Culture.

(pp. 207~209)

By T. YABUTA and Y. SUMIKI.

(Tokyo Imperial University; Received December 20, 1941.)

Studies on Ascorbic Acid. VI.

The Relation between Ascorbic Acid and Thiamin. II.

(pp. 209~216)

By Kichinosuke FUJIMURA.

(Laboratory of Nutritional Chemistry, Dept. of Agricultural and
Chemical Institute, Kyoto Imperial University;
Received October 14, 1941.)

**On the Manufacture of Artificial Fibres
from Proteins. (Part I).**

On the Artificial Fibres of Peanut Protein.

(pp. 217~226)

By Masami OKU and Yutaka HOSOKAWA.

(From the Chemical Fibre Laboratory, Ueda Imperial College of Sericulture
and Silk Industry; Received December 11, 1941.)

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TRANSACTIONS

Biochemistry of Filamentous Fungi. VII.

Mycelial Constituents of *Oospora sulphurea-ochracea*. Part IV. On the Constitution of Osoic Acid and its Derivatives.

By Hidejiro NISHIKAWA.

(Tottori Agricultural College)

Received December 8, 1941.

Further investigations on the constituents of *Oospora sulphurea-ochracea* have to some extent elucidated the constitution and interrelation of three of them (A, D and F) which will be described in the present communication.

A, D and F differ only in the number of methyl groups they contain; they are di-, tri- and monomethyl derivatives respectively of a methyl-free compound for which the name, osoic acid, is proposed for brevity (in Part II⁽¹⁾ it was provisionally labelled F').

Osoic acid $C_{18}H_{14}O_8^*$ was formed from either A or F through potash fusion and an expanded formula $C_{18}H_7O \cdot (OH)_8(COOH)_2$ has now been assigned to it. The formula was deduced from the following observations:

(1) Diazomethane readily introduces into D or A one or two more methyl groups respectively, giving tetramethylosoic acid I. (For tetramethylosoic acid II *v. infra*.)

(2) By means of prolonged action of a large excess of diazomethane an additional methyl group can be introduced into the above tetramethylosoic acid I, perfectly neutral pentamethylosoic acid now being formed.

(3) By the action of methyl alcoholic potash upon tetramethylosoic acid I two methyl groups are removed from it, giving a dimethyl derivative, which will be called dimethylosoic acid II as against its isomer A, dimethylosoic acid I.

(4) Similarly methyl alcoholic potash deprives pentamethylosoic acid of two methyl groups out of five. A trimethyl derivative thus formed, to which the name trimethylosoic acid II is given as against its isomer D, trimethylosoic acid I, is revealed by titration to be dibasic. As the original pentamethylosoic acid is perfectly neutral, the detached groups are supposed to be combined as methyl ester, whereas the remaining three must be linked as methyl ether.

(5) Equally dimethylosoic acid II must have two free carboxyl groups. Its

* In Part II the molecular formula of osoic acid was erroneously given which is now corrected.

isomer, dimethylosoic acid I, as it is soluble in bicarbonate solution, must have one free carboxyl group. Methyl groups are supposed to occupy the other carboxyl group and one of hydroxyl groups.

(6) As D, trimethylosoic acid I, is insoluble in bicarbonate solution, it will contain no free carboxyl group, two of its three methyl groups being employed for esterification and the remaining one combined as ether.

(7) The action of methyl alcoholic potash upon trimethylosoic acid I eliminates two methyl groups and converts it into F, monomethylosoic acid, the fact being in accord with the inference in (6).

(8) Dimethylosoic acid I loses one of methyl groups by the action of methyl alcoholic potash and is converted into F, this being obviously hydrolysis of ester. From these facts dimethylosoic acid I is a monomethyl ether monomethyl ester of osoic acid.

(9) One methyl group remaining in monomethylosoic acid is doubtlessly combined as ether, which is eliminated only when potash fusion is applied.

Piecing together these deductions the compounds mentioned above will be represented by the summarized formula below:

| | | | | | |
|----------------------------|--|----------------|----------------|----------------|----------------|
| | $C_{13}H_7O \left\{ \begin{array}{l} COOR_1 \\ COOR_2 \\ OR_3 \\ OR_4 \\ OR_5 \end{array} \right.$ | | | | |
| | R ₁ | R ₂ | R ₃ | R ₄ | R ₅ |
| Pentamethylosoic acid | Me | Me | Me | Me | Me |
| Tetramethylosoic acid I | Me | Me | Me | Me | H |
| Tetramethylosoic acid II * | H | Me | Me | Me | Me |
| Trimethylosoic acid I | Me | Me | Me | H | H |
| Trimethylosoic acid II | H | H | Me | Me | Me |
| Dimethylosoic acid I | H | Me | Me | H | H |
| Dimethylosoic acid II | H | H | Me | Me | H |
| Monomethylosoic acid | H | H | Me | H | H |
| Osoic acid | H | H | H | H | H |

Though there is some uncertainty except in the first and the last compounds as to which functional group or groups are involved in methylation, seven out of eight oxygen atoms in osoic acid are thus characterized, the function of the remaining one being yet to be determined. The proportions of carbon and hydrogen in osoic acid suggest the presence of two benzene rings and the linkage of diphenyl ether through the unconfirmed oxygen atom will be one of plausible structures. Attempts to grasp the nucleus, however, have so far been without success.

Ferric chloride reaction of osoic acid and its derivatives in alcoholic solution is shown in Table I.

TABLE I.

| | |
|----------------------------|--|
| Pentamethylosoic acid | nil |
| Tetramethylosoic acid I | violet, gradually changing to pale brown |
| Tetramethylosoic acid II * | nil |

* v. infra.

| | |
|------------------------|--|
| Trimethylosoic acid I | violet, gradually changing to pale brown |
| Trimethylosoic acid II | <i>nil</i> |
| Dimethylosoic acid I | deep violet |
| Dimethylosoic acid II | reddish violet, slowly fading |
| Monomethylosoic acid | deep violet |
| Osoic acid | deep violet |

From the above table it may be inferred that the free hydroxyl group which resists methylation is responsible for fading violet reaction, while one of the other two hydroxyl groups accounts for deep violet coloration suggestive of that of salicylic acid. The presence of a carboxyl group in the *ortho*-position of it might be anticipated.

ACTION OF CONC. SULPHURIC ACID UPON OSOIC ACID AND ITS DERIVATIVES.

Concentrated sulphuric acid deprives osoic acid of one molecule of water, giving anhydroosoic acid, which on methylation by means of diazomethane takes up four methyl groups and gives rise to a neutral tetramethyl derivative of anhydroosoic acid. On treatment of this neutral compound with alcoholic potash it loses one methyl group and is converted into a monobasic acid which is identical with the dehydration product of trimethylosoic acid II by conc. sulphuric acid. From these observations it will be considered probable that the dehydration in osoic acid took place between a carboxyl group of one benzene ring and a hydrogen of the other, closure to a xan-thone nucleus being a probable supposition. If this be the case, the molecular dimension of this compound is just one oxygen atom more than the xanthone derivative, 3-methyl-1 : 6-dihydroxy-8-carboxyxanthone, obtained from sulochrin⁽²⁾. Zinc dust distillation or fusion, however, has not so far given any clue to the existence of xanthone ring in this compound. Nor has potash fusion given any fragments suggestive of its structure. Anhydroosoic acid forms beautiful crystals from pyridine with two molecules of solvent of crystallization.

On similar treatment of monomethylosoic acid with conc. sulphuric acid a corresponding dehydration product is formed which, when recrystallized from pyridine, comes out in beautiful crystals with one molecule of pyridine of crystallization. In the case of dimethylosoic acid I simultaneous dehydration and demethylation seem to occur and the resulting substance is nothing but the anhydromonomethylosoic acid just mentioned above.

Anhydroosoic acid and anhydromonomethylosoic acid in alcoholic solution give a wine-red coloration with ferric chloride which is in marked contrast with a violet coloration in osoic acid, monomethylosoic acid, etc.

Action of conc. sulphuric acid in the cold upon pentamethylosoic acid does not effect dehydration but gives rise to a substance one methyl less than the original substance. This is an isomer of tetramethylosoic acid I and will be called tetramethylosoic acid II. The reaction may be explained as follows. Of two carboxyl groups the one which is concerned in ring-closure on sulphuric acid treatment of osoic acid and monomethylosoic acid is here esterified and consequently

hindered from being involved in dehydration. Conc. sulphuric acid effects only to drop a methyl group off the second carboxyl group situated at a remoter position. Upon trimethylosoic acid II on the other hand conc. sulphuric acid can effect dehydration as the carboxyl groups in this compound are considered to be both methyl-free due to hydrolysis. That anhydrotrimethylosoic acid II thus formed has the same nuclear system as anhydroosoic acid is obvious from the fact that on methylation the former is converted into the fully methylated product of anhydroosoic acid and conversely on treatment with ethyl alcoholic potash for some hours tetramethylanhydroosoic acid gives rise to anhydrotrimethylosoic acid II.

The mutual relations of osoic acid and its derivatives mentioned above will be as shown in the following scheme :

EXPERIMENTAL.

Dimethylosoic acid I.

M.p. 214°. Optical inactivity and other properties have been recorded in the previous paper⁽¹⁾. Methoxyl content freshly estimated showed correct value (Found: 17.37%. $2\text{CH}_3\text{O}$ in $\text{C}_{17}\text{H}_{16}\text{O}_8$ requires 17.82%).

Osoic acid.

Produced through potash fusion from either dimethylosoic acid I or monomethylosoic acid as described in the previous communication⁽¹⁾. Other methyl derivatives of osoic acid, *e.g.* tetramethylosoic acid I, give it as well on potash fusion. There the formula $\text{C}_{15}\text{H}_{14}\text{O}_8$ was given to it based on high H values, which, it is now evident, were due to its being exceedingly hygroscopic. Even kept in a desiccator it increases in weight. A fresh analysis with a carefully dried specimen gave the right value (Found: C, 55.90; H, 4.03%. $\text{C}_{15}\text{H}_{12}\text{O}_8$ requires C, 56.25; H, 3.76%).

Tetramethylosoic acid I.

To dimethylosoic acid I (4.8 g) dissolved in alcohol was added an ethereal solution of diazomethane. The solvent was then distilled off and the residue was recrystallized from alcohol. Platelets (2.4 g), m.p. 129°. It was also produced from trimethylosoic acid I in a similar manner. Sometimes crystals of lower m.p. were obtained which were found to be due to contamination of pentamethylosoic acid (Found: C, 60.52; H, 5.07%. $\text{C}_{19}\text{H}_{20}\text{O}_8$ requires C, 60.64; H, 5.32%. Methoxyl. 32.30, 32.89%. $4\text{CH}_3\text{O}$ in $\text{C}_{19}\text{H}_{20}\text{O}_8$ requires 32.98%).

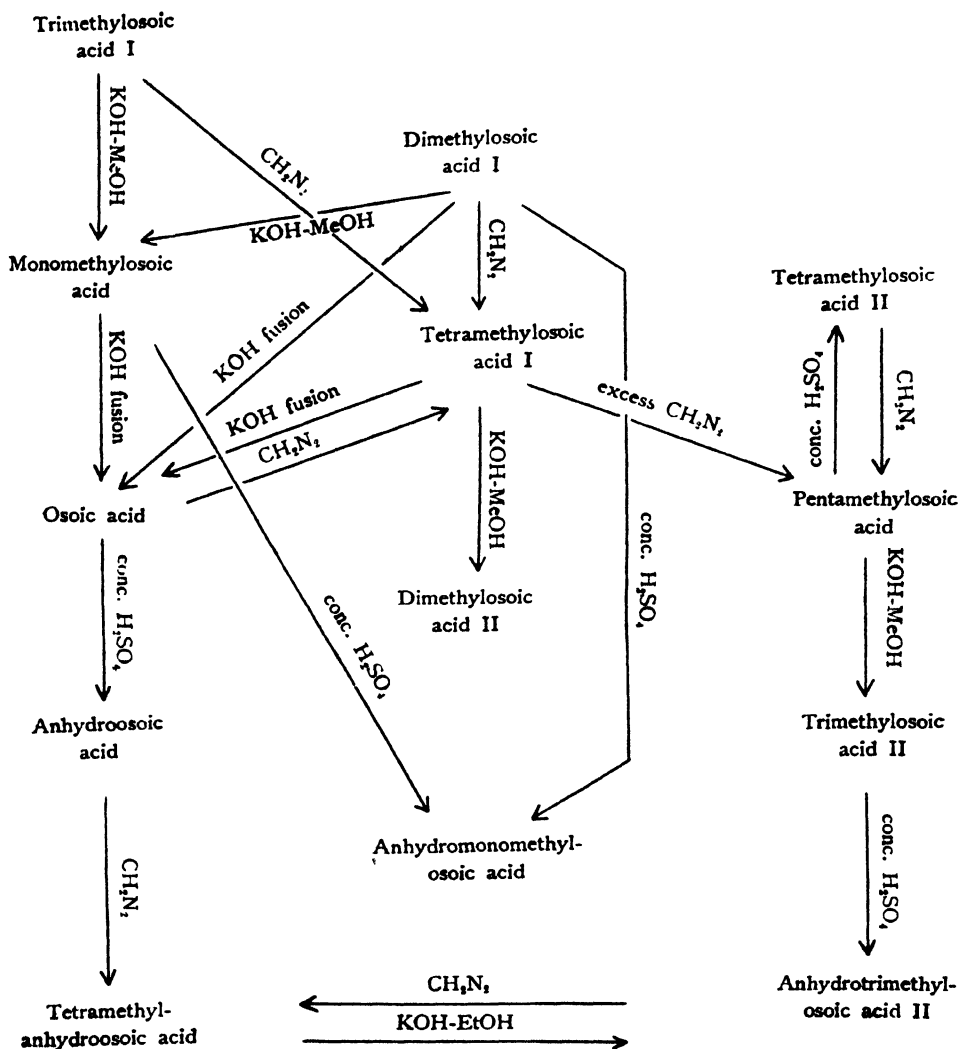
Dimethylosoic acid II.

Tetramethylosoic acid I (1 g) was boiled under reflux with methyl alcoholic potash (3 g KOH in 30 ml MeOH) for an hour. On cooling the solution was acidified and the separated solids were collected (0.8 g). The substance, on recrystallization from alcohol, formed thin prisms, m.p. 240° (decomp.). (Found: C, 58.49; H, 4.76%. $\text{C}_{17}\text{H}_{16}\text{O}_8$ requires C, 58.62; H, 4.60%. Methoxyl. 17.89%. $2\text{CH}_3\text{O}$ in $\text{C}_{17}\text{H}_{16}\text{O}_8$ requires 17.82%).

Pentamethylosoic acid.

To tetramethylosoic acid I (5 g) dissolved in a small quantity (20 ml) of acetone

a large excess of diazomethane in ether (prepared from 14.3 g of nitrosomethylurea) was added. The mixture was kept in a stoppered vessel for a week. Crystals deposited gradually on the wall and bottom of the vessel, which were collected (3.2g). It crystallizes in platelets from methyl alcohol, m.p. 149°. (Found: C,



61.34; H, 5.65%. $\text{C}_{20}\text{H}_{22}\text{O}_8$ requires C, 61.54; H, 5.64%. Methoxyl. 38.38, 38.28%. $5\text{CH}_3\text{O}$ in $\text{C}_{20}\text{H}_{22}\text{O}_8$ requires 39.74.)

Trimethyllosoic acid II.

Pentamethyllosoic acid (1 g) was boiled with KOH (5g) in methyl alcohol under reflux for a few hours. The solution was cooled and acidified and the separated solids were recrystallized from methyl alcohol, yield almost quantitative. Thick block crystals, m.p. 211°. (Found: C, 59.27; H, 5.03%. $\text{C}_{18}\text{H}_{18}\text{O}_8$ requires C,

59.67; H, 4.97%. Methoxyl. 25.21%. $3\text{CH}_3\text{O}$ in $\text{C}_{18}\text{H}_{18}\text{O}_8$ requires 25.69% Mol. wt. by titration as a dibasic acid. 373.9. $\text{C}_{18}\text{H}_{18}\text{O}_8$ requires 362.)
 Anhydroosoic acid.

A mixture of osoic acid (2 g) and conc. sulphuric acid (12 ml) was warmed on a water bath to a brownish yellow solution. On dilution with water, a dirty yellow flocky precipitate separated out, which was collected and dried on a porous plate (1.7 g). From acetone the substance crystallizes in thin needles (1.0 g). From the filtrate a further crop (0.4 g) was obtained. Ethyl alcohol is unsuited for recrystallization for the substance separates out from hot alcoholic solution partly as reddish amorphous material. It decomposes with violent effervescence at about 270° and changes to a yellowish opaque substance which on further heating turns black at about 300° (Found: C, 59.31; H, 3.53%. $\text{C}_{15}\text{H}_{10}\text{O}_7$ requires C, 59.60; H, 3.31%). It is insoluble in water, sparingly soluble in methyl alcohol. It crystallizes from pyridine in beautiful long needles with two molecules of pyridine which are lost at 150° in vac. (Loss of weight at 150° . 33.15%. $2\text{C}_5\text{H}_5\text{N}$ in $\text{C}_{15}\text{H}_{10}\text{O}_7 \cdot 2\text{C}_5\text{H}_5\text{N}$ requires 34.35%. Dried substance. Found: C, 59.70; H, 3.62%. $\text{C}_{15}\text{H}_{10}\text{O}_7$ requires C, 59.60; H, 3.31%.) Its alcoholic solution gives a wine-red coloration with FeCl_3 . The decomposition with effervescence at about 270° seems to be decarboxylation, for the substance thus formed, after recrystallization from acetone, gave analytical values nearly agreeing with decarboxylated substance (Found: C, 65.09; H, 4.65%. $\text{C}_{14}\text{H}_{10}\text{O}_3$ requires C, 65.12; H, 3.88%).
 Tetramethylanhydroosoic acid.

Anhydroosoic acid (0.8 g) was suspended in ethyl alcohol and diazomethane in ether was added. The methylated compound was recrystallized from alcohol, from which it formed pale yellow short prisms (0.7 g), m.p. 205° after sintering. It is insoluble in KOH; FeCl_3 and CaOCl_2 reactions *nil*. Its alcoholic solution shows a blue fluorescence (Found: C, 63.92; H, 5.20%. $\text{C}_{19}\text{H}_{18}\text{O}_7$ requires C, 63.69; H, 5.03%. Methoxyl. 33.62%. $4\text{CH}_3\text{O}$ in $\text{C}_{19}\text{H}_{18}\text{O}_7$ requires 34.64%.)

Anhydromonomethylosoic acid.

A mixture of monomethylosoic acid (2 g) and conc. sulphuric acid (12 ml) was warmed on a water bath to a brown-yellow solution. Anhydromonomethylosoic acid was precipitated by diluting with water while cooling, collected and dried (1.8 g). From pyridine it separated out as beautiful needles with solvent of crystallization. (Loss of weight at 150° . 20.60%. $\text{C}_5\text{H}_5\text{N}$ in $\text{C}_{10}\text{H}_{12}\text{O}_7 \cdot \text{C}_5\text{H}_5\text{N}$ requires 20.00%. Dried substance. Found: C, 60.77; H, 3.95%. $\text{C}_{16}\text{H}_{12}\text{O}_7$ requires C, 60.76; H, 3.80%. Methoxyl. 9.89%. CH_3O in $\text{C}_{16}\text{H}_{12}\text{O}_7$ requires 9.81%.) It changes colour at about 295° and decomposes completely over 340° . It is sparingly soluble in ethyl alcohol and gives a wine-red coloration with FeCl_3 . Dimethylosoic acid I was treated with conc. H_2SO_4 in a similar manner. The resulting substance gave identical analytical figures with those of anhydromonomethylosoic acid. One of the methyl groups was dropped along with a molecule of water. (Loss of weight at 150° . 20.63%. Dried substance. Found: C, 60.84; H, 3.90%. Methoxyl. 9.31%.)

Tetramethylosoic acid II.

Conc. sulphuric acid (6 ml) was added to pentamethylosoic acid (1 g), the mixture was rubbed with a glass rod to a solution and stood overnight in a desiccator. The dark red solution was poured into ice-water. The yellow precipitate (0.9 g) was dissolved in hot alcohol (20 ml) and filtered. On cooling minute block crystals were obtained, m.p. 225° ; FeCl_3 and CaOCl_2 reactions *nil*; soluble in NaHSO_3 . (Found: C, 60.35; H, 5.57%. $\text{C}_{19}\text{H}_{20}\text{O}_8$ requires C, 60.64; H, 5.52%. Methoxyl. 32.25%. $4\text{CH}_3\text{O}$ in $\text{C}_{19}\text{H}_{20}\text{O}_8$ requires 32.98%.) This compound was remethylated by means of diazomethane. The resulting substance, purified with absolute alcohol, formed short prisms and melted at 149° alone or mixed with the original pentamethylosoic acid.

Anhydrotrimethylosoic acid II.

Trimethylosoic acid II (0.5 g) was stirred and dissolved in conc. H_2SO_4 (4 ml) and stood for 45 hours. On pouring into ice-water, a milky white flocky precipitate was formed, which was collected and recrystallized from ethyl alcohol. Minute crystals (0.2 g), decomposed at about 280° ; FeCl_3 and CaOCl_2 reactions *nil*. (Found: C, 62.81; H, 5.02%. $\text{C}_{18}\text{H}_{16}\text{O}_7$ requires C, 62.79; H, 4.65%. Methoxyl. 26.40%, $3\text{CH}_3\text{O}$ in $\text{C}_{18}\text{H}_{16}\text{O}_7$ requires 27.03%.) This compound was obtained also through another way. A small quantity of tetramethylanhydrosoic acid was boiled under reflux with KOH in absolute alcohol for 4 hours. After cooling it was diluted with water and acidified with sulphuric acid. A flocky precipitate was collected, dissolved in hot alcohol, filtered and cooled in ice. Minute needle crystals separated out which decomposed at $280\sim 281^{\circ}$. Mixed melting point with anhydrotrimethylosoic acid showed no depression. Conversely anhydrotrimethylosoic acid II was methylated by suspending in a mixture of acetone and alcohol and adding an excess of diazomethane in ether. After standing for some time the solvent was distilled off and the residue, pale yellow prisms, melted at 205° alone or mixed with tetramethylanhydrosoic acid.

The expenses of this research have been partly defrayed from the Scientific Research Expenditure of the Department of Education to which the author desires to express his sincere gratitude.

SUMMARY.

Three crystalline constituents of the mycelium of *Oospora sulphurea-ochracea* were proved to be methylated products of osoic acid, a trihydroxydicarboxylic acid of the molecular formula, $\text{C}_{15}\text{H}_{10}\text{O}_8$. Other derivatives of osoic acid were also prepared.

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- (1) Nishikawa, Bull. Agr. Chem. Soc. Jap., **13**, 1 (1937).
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ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Über die quantitative Bestimmung der Pyrethrine.

XI. Mitteilung. Über den Pyrethringehalt
des Rauchs von Moskitostäbchen.*

(SS. 229~236)

Von Kiyosi WAKAZONO, Keizo HIRAOKA, und Sankiti TAKEI.

(Aus d. Institut f. Chem. Forschung, Universität Kyoto;
Eingegangen am 4. 12. 1941.)

Es interessierte uns zu wissen, ob der wirksame Bestandteil im Rauch der Moskitostäbchen durch die unzersetzten Pyrethrine gebildet wird, da diese, wie bekannt, gegen Hitze sehr unbeständig sind. Es ist aber nicht unmöglich, daß bei dem Abbrennen der Rauchstäbchen die Pyrethrine im rotglühenden Punkt vollkommen zerstört werden, wogegen am gerade benachbarten Stäbchenteil eine gemässigte Temperatur zu erwarten ist, so daß von diesem Teil aus die unzersetzten Pyrethrine selbst zusammen mit den übrigen Gasbestandteilen in die Luft vergast werden. Von dieser Überlegung ausgehend haben wir versucht, aus dem von den Moskitostäbchen aufsteigenden Rauch die Pyrethrine in irgendeiner Form zu erfassen.

Zunächst haben wir den aus den spontan verbrennenden Stäbchen gebildeten Rauch mit dem Luftstrom in eisgekühlte Sauggefäße geleitet, von denen dann nach dem völligen Abbrennen das an den Wänden kondensierte Teermaterial mit Äther und Natronlauge abgespült wurde. Die Ätherauszüge wurden mit verd. Natronlauge und verd. Schwefelsäure nachgewaschen. Aus dem so behandelten neutralen Teerbestandteil konnten wir mittels unserer massanalytischen Methode 5~7% des in den abgebrannten Stäbchen enthaltenen Gesamtpyrethrins nachweisen. Weiter noch wurden aus der Ablauge von mehreren Analysen Chrysanthemummonocarbonsäure (Amid, Schmp. 131°; Anilid, Schmp. 100~101°) und -dicarbonsäure (Schmp. 164°) identifiziert.

Auf Grund dieser Ergebnisse möchten wir annehmen, daß die Wirkung des von den Moskitostäbchen verbreiteten Rauchs auf die Insekten zweifellos der Wirksamkeit der feinverteilten Pyrethrine zuzuschreiben ist und daß, da die Menge desselben verhältnismässig immer nur sehr gering sein dürfte, die Wirkung des Pyrethrins in dieser Form eben höchst effektiv sein muß.

* Moskitostäbchen: Aus pyrethrinhaltigem Insektenpulver in Stäbchenform hergestelltes Begasungsmaterial.

On the Alluvial Soil in Kakuritu Prefecture, Northeast Manchuria.

(pp. 237~241)

By R. KAWASHIMA, M. NAGATA, S. TANAKA, and G. TÖYAMA.

(Agr. Chem. Laboratory, Kyūshū Imp. University; Received December 24, 1941.)

On a Slightly Podzolized and Regenerated Brown Forest Soil in Banseki Prefecture, Central Manchuria.

(pp. 242~244)

By R. KAWASHIMA, M. NAGATA, S. TANAKA and G. TÖYAMA.

(Agr. Chem. Laboratory, Kyushu Imp. University; Received January 6, 1942.)

Der bakterielle Abbau der Aminosäuren. I. Mitteilung.

Der oxydative Abbau der Aminosäuren durch

Bac. proteus vulgavis HAUSER.

(SS. 245~256)

By Teijirō UYEMURA.

(Wissenschaftl. Laboratorium von Ch. Takeda & Co. Ltd., Osaka;

Eingegangen am 26. 11. 1941.)

Study on Alcoholysis.

I. The Variation of Reaction Velocity to the Kinds of Alcohol.

(pp. 257~264)

By Hogai KA and Kozo KAWAKAMI.

(The Institute of Scientific Research Manchoukuo; Received November 28, 1941.)

Last year one of the authors reported a new method for the quantitative determination of glycerine even in the presence of other alcohols or impurities.

In the present method the alcoholysis of different kinds of alcohols, using $N/10$ NaOH as catalyser, was studied by determining the quantity of free glycerine in reaction mixture at definite intervals.

The alcoholysis was carried out by adding 100 cc of $N/10$ NaOH alcoholic solution to 50 gr of olive oil with constant stirring at $22\sim 24^{\circ}\text{C}$ and the reaction fatty acid present was instantly combined with the alcohol to form the ester. was allowed to proceed for 24 hrs. The acetyl value and acid value were also determined during the course of the reaction. The following results were obtained:—

1. The acetyl value increased greatly at the first 10 minutes and then decreased later to a constant.

2. The acid value increased also as the reaction proceeded, but the quantity of the free fatty acid present was found to be less than that calculated from the increases of the acetyl value. Therefore, it may be considered that the excess of

fatty acid present was instantly combined with the alcohol to form the ester. So, in the so-called alcoholysis reaction the production of ester can be considered in two directions. One is the direct substitution of glycerine and alcohol, and the other the esterification of fatty acid delivered by the increase of acetyl value.

3. The quantity of ester production, both in the case of direct substitution and total ester production, the replacing power of the alcohols with odd number of carbon atoms was stronger than their respective adjacent member with even number of carbon atoms.

4. The replacing power was strongest with alcohols containing less than 5 carbon atoms, and decreased as the number of carbon atoms increased over six.

5. The replacing power of the secondary alcohols such as *i*-propyl alcohol was weakest among the alcohols, and for alcohols, which contain a ring such as benzyl alcohol the replacing power was also weak.

6. The replacing power of the normal alcohol was better than that of the *iso*-alcohol with the same number of carbon atoms.

From the above results it was found that the alcohols have a specific replacing power and it may be suggested that they may show a selective replacing power in alcoholysis.

Über die Vitamin-B₁ Adsorption durch Hefe.

(SS. 265~268)

Von M. ODA und K. NAGAO.

(Laboratorium von Meiji-Seito & Co, Ltd., Tokio, Eingegangen am 24. 12. 1941.)

On the Stimulant for Cane Sugar Formation in Plants. (X).

(pp. 269~272)

By Tetutaro TADOKORO and Takeshi SASAKI.

(Hokkaido Imperial University; Received December 1, 1942.)

On the Biochemical Properties of Tomato and Potato Virus. (3).

(pp. 273~275)

By T. TADOKORO, T. SAITO, and N. TAKASUGI.

(Hokkaido Imperial University; Received December 17, 1941.)

A New Simple Method for the Quantitative Determination of Glycerine (Supplement).

(pp. 276~278)

By Hogai KA.

(The Institute of Scientific Research, Manchoukuo; Received November 28, 1941.)

Further investigation on the method for the quantitative determination of

glycerine based on Denigés glycerine and codein colour reaction was carried out. In this paper, ways were described for carrying out this method and the original equation (A) for the calculation of the percentage of glycerine was modified as follows:—

$$\text{Glycerine \%} = 0.0526 \times \text{Blue value} + 0.015 \dots\dots\dots (A)$$

Studies on Methionine and its Derivatives. (IV).

Nutritional Effect of *l*(-)-Methionine and its Derivatives for the Albino Rat on Cystine-Deficient Diet, especially that of the Oxydative Derivatives Containing Sulfur such as *l*(+)-Methionine Sulfoxide and *l*(+)-Methionine Sulfone.

(pp. 279~288)

By Yoshio TSUCHIYA.

(S. Suzuki & Co. Ltd; Received December 24, 1941.)

In the present paper, the author has studied the replaceability of methionine with its derivatives in the cystine-deficient diet of albino rats, especially the oxydative derivatives containing sulfur such as methionine sulfoxide and methionine sulfone (a new amino acid).

And the relation between methionine and its oxydative derivatives and the mechanism of the transformation of methionine to cystine were discussed in some respects. The results obtained are summarized as follows:

(1) *l*(-)-Methionine showed a marked growth promoting effect on the rat on the cystine deficient diet.

(2) *l*(+)-Methionine sulfoxide showed the same effect as methionine.

(3) The assumption is proposed that the effectiveness of *l*(+)-methionine sulfoxide is perhaps due to the return to methionine by some reducing agents such as cysteine, reduced glutathione, or, possibly, by some reducing enzymes. Methionine sulfoxide is reduced readily by hydriodic acid or slowly by cysteine. Accordingly, the oxidation of the sulfur contained in methionine does not occur *in vivo*. In other words, methionine sulfoxide is not formed as the intermediate in the transformation of methionine to cystine.

(4) The growth curves of rats fed with *l*(-)-methionine, *l*(+)-methionine sulfoxide, and *l*(-)-cystine were identical. It may be stated that the physiological availability of these compounds is the same.

(5) *l*(+)-Methionine sulfone had no nutritional effect. It is now assumed that neither the oxidation of the sulfur contained in methionine to sulfone stage in the course of the transformation of methionine to cystine, nor the reduction of this compound to methionine or methionine sulfoxide take place *in vivo*.

The latter fact was chemically demonstrated, i. e., methionine sulfone is not reduced either by hydriodic acid or by cysteine.

(6) γ -Methylmercapto-propyl-amine was not effective as cystamine, and rather toxic to some rats, causing retardation of the increase of the body weight, falling of hair, or death.

**On Some Properties of the Cane Molasses
Produced by the Sulphitation Process.**

(pp. 289~296)

By Yoshi IWATA, Shinichi SUZUKI, and Yutaka KAWAI.

(Government Sugar Experiment Station, Tainan, Taiwan, Japan;

Received December 29, 1941.)

Studien über Denaturierung des Sericin (Seidenleime).

V. Mitteilung.

(SS. 297~307)

Von Z. HIROSE.

(Aus dem Chemischen Institut für Seidenbau, der Aktiengesellschaft Gunze

Seisi zu Ayabe, Kioto-hu, Eingegangen am 3. 12. 1941.)

Studies on Arginase. (IV).

On the Purification of Beef Liver Arginase and Some
Properties of the Purified Arginase.

(pp. 308~314)

By Matsunosuke KITAGAWA and Masaharu SIRAKAWA.

(Institute of Agricultural Chemistry, Faculty of Agriculture, Kyushu Imperial

University, Fukuoka; Received December 24, 1941.)

Nutritive Value of Pentosan (IX).

Distribution of Hardly Soluble Carbohydrates.

(pp. 315~324)

By Hisayoshi IWATA and Ryosuke KIKUCHI.

(Morioka Imperial College of Agriculture and Forestry;

Received December 4, 1941.)

The distribution of pentosan and crude fiber in the uncultivated vegetable food materials, ordinary food materials, herbaceous plant materials and ordinary stuffs in North Japan were investigated.

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

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(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Studies on Ascorbic Acid. VII.

The Relation between Ascorbic Acid and Vitamin A. (I).

(pp. 325~329)

By Kichinosuke FUJIMURA.

(Laboratory of Nutritional Chemistry, Dept. of Agricultural and
Chemical Institute, Kyoto Imperial University;

Received January 23, 1942)

Chemical Studies on Tomato Ring Mosaic Virus.

I. The Isolation of Crystalline Protein Possessing the General
Properties of Tomato Ring Mosaic Virus.

(pp. 330~334)

By Matsunosuke KITAGAWA and Satoru AKUNE.

(Institute of Agricultural Chemistry, Faculty of Agriculture, Kyushu Imperial
University, Fukuoka; Received December 22, 1941.)

On the Slightly Podzolized Brown Forest Soil in Tonka Prefecture, North Manchuria.

(pp. 335~338)

By R. KAWASHIMA, M. NAGATA, S. TANAKA, and G. TōYAMA.

(Agr. Chem. Laboratory, Kyūshū Imp. University; Received January 9, 1942.)

Butyric Acid Fermentation. (Part I.)

(pp. 339~350)

By Toshinobu ASAI, Eitaro KOMATSU,
and Noboru MIYAJI.

(Agr. Chem. Laboratory, Tokyo Imperial University; Received January 19, 1942.)

SUMMARY

(1) A detailed morphological and cultural diagnosis is given of three strains of butyric acid-producing Clostridia, isolated from soils and sweet potato.

(2) Their nomenclature and taxonomy are discussed, and reasons are given for classifying one of the strains as belonging to a variety of *Clostridium butyricum* Prazmowski, and the other two strains, by their greater production of butanol and other facts, as belonging to a new species of the Genus *Clostridium* Prazmowski.

The new names given for the three strains: *Clostridium butyricum* var. *immobile*, *Clostridium butanologenes* nov. sp. and *Clostridium butanologenes* nov. sp. var. *intermedium* nov. var.

(3) *Clost. butyricum* var. *immobile* shows a remarkable denaturation during cultivation, the spore-forming ability becomes strongly reduced and its typical sporangial cell forms are very rarely noticeable. This strain produces large amounts of butyric acid from glucose (over 30% yield to the consumed sugar), so this may be used for the industrial purpose of butyric acid manufacture.

(4) *Clost. butanologenes* nov. sp. produces higher yields of butanol from glucose and its technical application is also suggested.

(5) *Clost. butanologenes* nov. sp. var. *intermedium* nov. var. stands intermediately in the biochemical characters, viz., it chiefly produces butyric acid and butanol.

(6) A quantitative comparison was made of the products of fermentation of glucose and corn mash by these three strains.

Dietary Studies on the Increase of Utilizing Value of Northern Farm Animals.

IV. On the Fox Feed.

(pp. 351~359)

By E. TAKAHASHI and K. SHIRAHAMA.

Department of Agriculture, Hokkaido Imperial University;
Received January 6, 1942.)

Der bakterielle Abbau der Aminosäuren. II. Mitteilung.

Einige Effekte auf die Bildung der oxydativen *l*-Aminosäure-
Desaminase in *Bac. proteus vulgaris* HAUSER.

(SS. 360~364)

By Teijirô UYEMURA.

(Wissenschaftl. Laboratorium von Ch. Takeda & Co. Ltd., Osaka.
Eingegangen am 26. 11. 1941.)

Studies on the Manufacture of the Artificial Baits from Fish-viscera.

I. Preliminary Experiments.

(pp. 365~368)

By Eiichi TANIKAWA and Fumio YAMAZAKI.

(Hakodate College of Fisheries; Received January 26, 1942.)

Artificial baits were made from the internal organ of land animals, but the authors have tried to make them from that of fishes and compared their effects. Results were as follows:

TABLE.

| Name of samples | Wt. of dried substance (g) | Wt. of CaO in dried substance (g) | Wt. of CaO / Wt. of dried substance | Average | Remaining CaO in the substance (%) | Effects of deliming (%) |
|--------------------------------------|----------------------------|-----------------------------------|-------------------------------------|---------|------------------------------------|-------------------------|
| After liming (as con.rol) | 6.80 8.30 | 0.2040 0.2945 | 3.00 3.55 | 3.28 | 100 | |
| Commercial "Oropon" | 6.35 6.45 | 0.0590 0.0585 | 0.929 0.905 | 0.917 | 28.0 | 72.0 |
| Artificial baits from salmon viscera | 8.75 8.25 | 0.0935 0.0785 | 1.070 0.951 | 1.010 | 30.8 | 69.2 |
| A. B. from cod viscera | 7.48 7.00 | 0.0898 0.0610 | 0.800 0.873 | 0.836 | 25.5 | 74.5 |
| A. B. from herring-viscera | 7.16 7.50 | 0.0554 0.0590 | 0.774 0.786 | 0.780 | 24.1 | 75.9 |
| Ammonium sulphate | 6.03 6.58 | 0.0305 0.0410 | 0.500 0.624 | 0.562 | 17.2 | 82.8 |

The authors are carrying on further studies based on the above mentioned results.

Studies on the Vitamins of Fish Livers. (Part IV.)

Lactoflavin Content of Fish Livers.

(pp. 369~378)

By Hideo HIGASHI and Shigeo ISEKI.

(Imperial Fisheries Experimental Station, Tokyo, Japan; Received January 16, 1942.)

The present authors determined the lactoflavin content of livers of several species.

The determination of lactoflavin was carried out by the following method. The livers are minced and dried over the water bath under agitation. The dried livers are extracted with ether to remove the ether-soluble matter. 5 g of fat-free livers are extracted with 250 cc of hot water (90°C). The water extracts are washed with chloroform to remove the chloroform-soluble matter. Chloroform remaining in water layer is evaporated off under reduced pressure. Then KOH is added to the water extracts ($n/2$ KOH). Alkaline solution thus gained is exposed to the light of 500-watt-lamp for 2 hours at the distance of 20 cm. During exposure to the light the solution must be kept below 20°C. Thus the lactoflavin in the sample is converted to lumilactoflavin. Then the solution is acidified with HCl (pH 5) and extracted with chloroform. Chloroform extracts are collected and dried with anhydrous Na_2SO_4 and evaporated to small volume. Lumilactoflavin content of the solution is determined with Pulfrich photometer using filter S 47. The experimental results are as follows:

Table I.

| Species | Fishing Season | Locality | Sex | Body Length cm. | Body Wt. g. | Liver Wt. (%) | | Moisture Content of Liver (%) | Oil Content of Liver (%) | C. L. O. U. of Liver Oil | Lactoflavin | | |
|---------------------------|--------------------|----------|--------|--------------------|-------------|-----------------------|------|-------------------------------------|-----------------------------|-----------------------------|-------------------------------|-----------------------------|--------------------------------------|
| | | | | | | Liver Wt. Body Wt. | | | | | in 100g Fresh Liver (r) | in 100g Dry Liver (r) | in 100g Fat Free Dry Liver (r) |
| Neothunnus macropterus | Jan. 28th, 1940 | Parao | Male | 121 | 41500 | 0.430 | 72.0 | 2.80 | 210 | 1346 | 4806 | 5340 | |
| | | | Male | 117 | 38200 | 0.477 | 72.4 | 2.04 | 147 | 955 | 3462 | 3738 | |
| | | | Male | 85 | 13900 | 0.575 | 72.5 | 3.25 | 84 | 647 | 2352 | 2667 | |
| | | | Female | 121 | 39000 | 0.680 | 72.0 | 2.38 | 420 | 1093 | 3903 | 4266 | |
| | | | Female | 115 | 30200 | 0.682 | 71.0 | 3.25 | — | 1375 | 4741 | 5340 | |
| | | | Female | 108 | 27300 | 0.623 | 71.0 | 3.37 | — | 830 | 2863 | 3240 | |
| Katsuwonus vagans | Dec. 16th, 1940 | Parao | Male | 44 | 2120 | 1.320 | 66.7 | 4.57 | 49 | 1096 | 3292 | 3816 | |
| | | | Male | 39.2 | 1455 | 1.685 | 59.5 | 15.43 | 21 | 903 | 2228 | 3600 | |
| | | | Male | 35 | 1090 | 1.74 | 61.5 | 15.42 | 5.2 | 216 | 561 | 936 | |
| Theragra chalcogramma | Feb. 8th, 1941 | Hokkaido | — | 36~45 | 450~ 800 | 2.61 | 53.3 | 20.4 | 98 | 726 | 1554 | 2760 | |
| | | | — | 27~35 | 200~ 400 | 2.40 | 40.1 | 34.86 | 12.6 | 646 | 1079 | 2580 | |

| | | | | | | | | | | | | |
|--------------------------|-----------------|----------|--------|------|-------|-------|------|-------|-------|------|-------|-------|
| Scomber japonicus | Oct. 9th, 1940 | Izu | Male | 33.5 | 390 | 1.47 | 68.7 | 6.28 | — | 537 | 1717 | 2148 |
| | | | Male | 21.8 | 138 | 2.62 | 71.6 | 3.36 | — | 93 | 326 | 370 |
| | Sep. 12th, 1941 | Shiogama | — | 25.8 | 115.5 | 0.847 | — | — | — | 370 | — | — |
| | | | — | 19.2 | 98.0 | 2.44 | — | — | — | 175 | — | — |
| Makaira mazara | Jan. 30th, 1940 | Parao | Male | 184 | 58125 | 0.654 | 73.6 | 4.39 | 560 | 1508 | 5711 | 6850 |
| | | | Male | 171 | 53256 | 0.438 | 60.7 | 16.62 | 84 | 737 | 1876 | 3250 |
| Cyprinus carpio | Nov. 10th, 1941 | Chiba | Male | 33.0 | — | — | 68.6 | 3.91 | — | 1327 | 4227 | 4828 |
| | | | Male | 16.2 | — | — | 70.7 | 2.77 | — | 1053 | 3595 | 3970 |
| Kareius coloratus | Oct. 30th, 1940 | Ibaragi | Female | 44.3 | 1745 | 2.44 | 60.0 | 15.0 | 7 | 536 | 1341 | 2145 |
| | | | Female | 28.8 | 520 | 1.96 | 49.3 | 25.7 | 0.6 | 209 | 412 | 836 |
| | | | Female | 26.7 | 448 | 2.28 | 44.8 | 30.2 | 1.3 | 111 | 201 | 444 |
| Sebastes baramenue | Nov. 1941 | Iwate | Male | 52.0 | 2940 | 1.02 | 70.0 | 7.33 | 450 | 202 | 672 | 890 |
| | | | Male | 39.8 | 1621 | 1.02 | 67.0 | 10.2 | 350 | 159 | 482 | 698 |
| | | | Female | 54.0 | 3632 | 1.62 | 58.0 | 19.3 | 630 | 496 | 1181 | 2185 |
| | | | Female | 38.5 | 1480 | 1.70 | 65.5 | 11.5 | 350 | 96 | 278 | 417 |
| Pristipomoides sieboldii | Nov. 23th, 1940 | Izu | Male | 60.0 | 5965 | 0.65 | 58.1 | 12.4 | 110 | 104 | 248 | 353 |
| | | | Male | 58.0 | 4960 | 0.57 | 57.7 | 12.8 | 45 | 69 | 156 | 234 |
| Squalus suckleyi | Nov. 4th, 1941 | Izu | Female | 66.0 | 2330 | 4.60 | 41.7 | 47.7 | 5.4 | 121 | 207 | 1138 |
| | | | Female | 61.0 | 2135 | 6.90 | 34.0 | 57.0 | 3.5 | 72 | 109 | 870 |
| Paracaesio caeruleus | Dec. 1941 | Okinawa | Male | 38.2 | 1280 | 0.353 | 73.2 | 3.41 | 12 | 8374 | 31245 | 35800 |
| | | | Male | 32.0 | 943 | 0.284 | 72.7 | 3.89 | Trace | 132 | 483 | 563 |

Table II.

| Species | Fishing Season | Locality | Sex | Body Length cm. | Body Wt. g. | Liver Wt. Body Wt. (%) | Moisture Content of Liver (%) | Oil Content of Liver (%) | C. L. O. U. of Liver Oil | Lactoflavin | | |
|------------------------|-----------------|----------|--------|-----------------|-------------|------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-----------------------|------------------------|
| | | | | | | | | | | in 100g Fresh Liver (γ) | in 100g Dry Liver (γ) | Fat-free Dry Liver (γ) |
| Germo germo | Mar. 27th, 1941 | Izu | — | 49~64 | 5812~6637 | 1.05 | 72.2 | 2.16 | 92.5 | 2621 | 9427 | 10222 |
| | | | — | 65 | 6037 | 1.05 | 72.2 | 2.16 | — | 2433 | 8751 | 9490 |
| Thunnus orientalis | Mar. 6th, 1939 | Chiba | Male | 191 | 136500 | 1.09 | 52.0 | 11.54 | 33 | 2625 | 5469 | 7200 |
| | | Russun | — | — | — | — | 60.4 | 19.57 | 420 | 4302 | 10864 | 21480 |
| | | " | — | — | — | — | 62.6 | 13.69 | 350 | 998 | 10688 | 16860 |
| Neothunnus macropterus | Oct. 1940 | Parao | — | — | — | — | 71.7 | 2.04 | 245 | 663 | 2344 | 2526 |
| Katsuwonus vagans | Feb. 16th, 1940 | Parao | Female | 44 | 3750 | 1.74 | 68.2 | 4.19 | 50 | 1016 | 3195 | 3680 |
| Xiphias gladius | Jan. 22th, 1941 | Chiba | Male | 200 | 148500 | 0.96 | 63.8 | 5.38 | 1000 | 1301 | 3594 | 4222 |
| | Mar. 2th, 1941 | Chiba | Male | 158 | 95250 | 1.70 | — | — | 62 | — | — | 665 |
| Makaira mazara | Jan. 30th, 1940 | Parao | Male | 184 | 58125 | 0.65 | 73.6 | 4.39 | 560 | 1508 | 5711 | 6850 |
| | | | Male | 171 | 53250 | 0.44 | 60.7 | 16.62 | 84 | 737 | 1876 | 3250 |

| | | | | | | | | | | | | |
|--------------------------------------|-------------------|--------------------|--------|---------------|--------|------|------|-------|------|------|------|-------|
| <i>Epinephelus poecilonotus</i> | Mar. 17th, 1941 | Izu | — | 38.4 | 1875 | 1.01 | 60.8 | 3.80 | 11 | 1439 | 3671 | 4065 |
| <i>Epinephelus caruleo-punctatus</i> | Apr. 1941 | Parao | — | 95 | 356000 | 2.39 | 54.4 | 16.56 | 14.7 | 77 | 169 | 266 |
| <i>Etelis carbunculus</i> | Nov. 15th, 1940 | 29°30'~129°28'30'' | Male | 53 | 3740 | 1.71 | 74.2 | 3.41 | 126 | 470 | 1822 | 2100 |
| <i>Belaenoptera musculus</i> | Jan. 9~16th, 1939 | Antarctic | Male | 2.64m.~2.79m. | — | — | 70.2 | 4.21 | — | 1820 | 6107 | 7112 |
| | | | Male | 2.31m.~2.64m. | — | — | 70.2 | 2.63 | 336 | 1691 | 5675 | 6224 |
| | | | Male | 2.15m.~2.31m. | — | — | — | 1.98 | 90 | — | — | 4089 |
| | | | Female | 2.31m.~2.64m. | — | — | 75.3 | 3.61 | 196 | 1200 | 4854 | 5688 |
| <i>Balaenoptera physalus</i> | Jan. 9~16th, 1939 | Antarctic | Male | 1.81m.~2.15m. | — | — | — | 1.78 | 84 | — | — | 7556 |
| | | | Female | 2.15m.~2.30m. | — | — | — | 2.11 | 5.0 | — | — | 6578 |
| <i>Megaptera nodosa</i> | Jan. 9~16th, 1939 | Antarctic | Male | 1.45m.~1.65m. | — | — | 80.1 | 2.17 | 49 | 1876 | 9426 | 10580 |
| | | | Male | 1.30m.~1.65m. | — | — | 73.5 | 3.03 | — | 1627 | 6140 | 6933 |
| | | | Male | 1.15m.~1.30m. | — | — | 76.6 | 2.69 | 98 | 1399 | 5979 | 6756 |
| | | | Female | 1.30m.~1.65m. | — | — | 74.2 | 2.94 | 147 | 1503 | 5828 | 6578 |
| <i>Cyprinus carpio</i> | Nov. 10th, 1941 | Chiba | Male | 33.0 | — | — | 68.6 | 3.91 | — | 1327 | 4220 | 4828 |
| | | | Male | 16.2 | — | — | 70.7 | 2.77 | — | 1053 | 3595 | 3970 |
| <i>Anguilla japonica</i> | Sep. 23th, 1941 | Kanagawa | — | — | 375 | — | — | — | — | 80 | — | — |
| | | | — | — | — | — | — | — | — | 14.5 | — | — |
| <i>Oncorhynchus nerks</i> | Dec. 5th, 1939 | Kamchatka | — | — | — | — | 66.7 | 8.30 | 75 | 718 | 2154 | 2870 |
| <i>Sebastes baramenue</i> | Mar. 1939 | Miyagi | Male | — | — | — | 58.0 | 12.0 | 150 | 270 | 643 | 900 |
| <i>Scoliodon walbeem</i> | May 4th, 1941 | Parao | Male | 132 | 34000 | 0.47 | 46.2 | 36.1 | 0.44 | 299 | 556 | 1690 |
| <i>Lamna cornubica</i> | Jan. 22th, 1941 | Chiba | Female | 185 | 98250 | 6.42 | 33.8 | 38.8 | 21 | 1145 | 1729 | 4178 |
| <i>Cynias manzo</i> | Jan. 20th, 1941 | Chiba | Female | 72 | 2140 | 9.35 | 44.4 | 29.4 | — | 545 | 980 | 2080 |
| <i>Pseudotriakis acreges</i> | May 12th, 1941 | Izu | Male | 130 | 14800 | 8.12 | 44.4 | 35.5 | 0.62 | 200 | 360 | 995 |
| <i>Squalus brevirostris</i> | Nov. 4th, 1941 | Izu | Female | 77 | 4550 | 6.50 | 32.0 | 59.2 | 5.25 | 325 | 477 | 3689 |
| <i>Etmopterus pusillus</i> | Nov. 4th, 1941 | Izu | — | 23 | 182 | 7.00 | 16.0 | 75.1 | 1.2 | 435 | 518 | 4888 |
| <i>Chimaera phantasma</i> | Nov. 4th, 1941 | Izu | — | — | — | — | 48.0 | 42.6 | 9.0 | 812 | 1561 | 8636 |
| | | | — | — | — | — | 40.5 | 45.2 | 0.52 | 1085 | 1824 | 7589 |
| <i>Etmopterus lucifer</i> | Nov. 4th, 1941 | Izu | — | 30 | 158 | 8.80 | 60.0 | 30.9 | 0.7 | 278 | 696 | 3060 |
| <i>Squalus suckleyi</i> | Nov. 4th, 1941 | Izu | Female | 66 | 2330 | 4.60 | 41.7 | 47.7 | 5.4 | 121 | 206 | 1138 |
| | | | Female | 61 | 2135 | 6.90 | 34.0 | 57.7 | 3.5 | 72 | 109 | 870 |
| <i>Symonodon ringens</i> | Nov. 4th, 1941 | Izu | Female | 82 | 3780 | 17.5 | 13.3 | 76.7 | 3.5 | 14 | 16 | 137 |
| <i>Galeorhinus griseus</i> | Nov. 4th, 1941 | Izu | Male | 82 | 3330 | 4.80 | 41.7 | 44.8 | 35 | 65 | 112 | 483 |

According to these results, it is recognised that the fluctuation of the lacto-flavin content in livers is fairly large.

In the same species the livers of older fish contain more lactoflavin than those of younger fish (Table I).

On the Vitamin C and Glutathione Contents of Mulberry Leaves.

(pp. 379~393)

By K. KATAI.

(Department of Agriculture, Kyūshū Imp. University; Received January 9, 1942.)

On the Dehydrogenase Action in the Sliced Brain Tissue of the Rat.

(pp. 394~396)

By Tetutarō TADOKORO and Tuneyuki SAITO.

(Hokkaido Imperial University; Received December 17, 1941.)

Untersuchug über Fett und Öle der Getreidefenniche. I. Freie Fettsäure.

(SS. 397~401)

Von Tetsujiro ŌBARA.

(In der Chem. Abteilung der Landwirtschaftl. Erziehungsfachschule zu Tokyo.
Eingegangen am 6. 12. 1941.)

On the Quantitative Determination of Pyrethrine in Mosquito Coils.

(pp. 402~404)

By Masao NISHIKADO.

(Research Laboratory of Azumi-Dai-Yakubo Co.; Received January 22, 1942.)

On the Acid Fermentation of *Aspergillus niger*. (Part I.)

(pp. 405~414)

By Kinichiro SAKAGUCHI and Sinitiro BABA.

(Agricultural Chemical Laboratory, Tokyo Imperial University;
Received December 11, 1941.)

Recently Sakaguchi, Asai and Munekata⁽¹⁾ have shown that *Rhizopus* G 36, which produces solely lactic acid from glucose, formed remarkable quantities of fumaric acid instead of lactic acid in the medium containing ethyl alcohol or acetic acid as the sole source of carbon.

In the present work the authors have tried to confirm whether an analogous case might be found, using two strains of *Asp. niger*, one of which belongs to the so called citric acid former and the other to the gluconic acid former. The carbon sources used are glucose (C₆), glycerol (C₃), pyruvic acid (C₃), ethyl alcohol (C₂) methanol and formic acid (C₁). The summary of the results obtained is as follows :

The yields of *citric acid* against the substrates consumed :—

| Substrates | <i>Asp. niger</i> var No 2 The citric acid former | <i>Asp. niger</i> var No 25 The gluconic acid former |
|-------------|--|---|
| Glucose | 78~80% | 0 |
| Glycerol | 2.7 | 1.3% |
| Na-pyruvate | 0 | 0 |
| Ethanol | 2.0 | 2.0 |
| Na-formate | 0 | 0 |
| Methanol | 0 | 0 |

The Yields of *oxalic acid* against the substrates consumed :—

| | | |
|-------------|----------|------|
| Glucose | 0 | 0 |
| Glycerol | 0 | 2.1% |
| Na-pyruvate | 7.5~8.5% | 0 |
| Ethanol | 4.1 | 1.0 |
| Na-formate | 35.0 | 30.0 |
| Methanol | 10.0 | 6.0 |

The yields of other products :—

| The Substrates added Products | The citric acid former (<i>Asp. niger</i> var No 2) | | | | |
|----------------------------------|--|-------------------------|----------------------|---------------------|-------------------|
| | Glycerol (80 g) | Na-pyruvate (20~50g) | Ethanol (60 g) | Na-formate (4 g) | Methanol (4 g) |
| Succinic acid | 0 | 0.05 g | 0.20 g | 0 | 0 |
| Fumaric acid | 0 | 0.10 | 0.25 | 0 | 0 |
| L-Malic acid | 0 | 0.30 | 0.20 | 0 | 0 |
| Pyruvic acid | 0 | — | 0 | 0 | 0 |
| Acetic acid | 0 | 0 | 0.25 (as Ag salt) | 0 | 0 |
| Glycolic acid | 0 | 0 | 0.20 | 0 | 0 |
| Acetaldehyde | 0 | 0 | + | 0 | 0 |
| Ethanol | 0 | 0 | — | 0 | 0 |

| The Substrates added Products | The gluconic acid former (<i>Asp. niger</i> var No 25) | | | | |
|----------------------------------|---|-----------------------|-------------------|----------------------|--------------------|
| | Glycerol (80 g) | Na-pyruvate (20 g) | Ethanol (60 g) | Na-formate (10 g) | Methanol (10 g) |
| Succinic acid | 0 | 0.05 g | 0 | 0 | 0 |
| Fumaric acid | 0 | 0.20 | 0.09 g | 0 | 0 |
| L-Malic acid | 0 | 0 | 0.15 | 0 | 0 |
| Pyruvic acid | 0 | — | 0 | 0 | 0 |
| Acetic acid | 0 | 0 | 0 | 0 | 0 |
| Glycolic acid | 0 | 0 | 0.05 | 0 | 0 |
| Acetaldehyde | 0 | 0 | 0 | 0 | 0 |
| Ethanol | 0 | 0 | — | 0 | 0 |

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Separation and Identification of Fatty Acids. Part 7.

Preparation of Erucahydroxamic and Brassidohydroxamic
Acids, and Isolation of Pure Erucic Acid.

(pp. 415~418)

By H. YUKAWA and Y. INOUE.

(Biochemical Laboratory, Department of Agriculture, Kyoto Imperial University;

Received February 13, 1942.)

In previous papers of this series, the preparation methods of hydroxamic acid derivatives of fatty acids, following the recovering of free fatty acids as pure samples, have been published. In this present paper, the preparation of erucahydroxamic acid from erucic acid methylester and also from rape seed oil were described. And its melting point $75.5\sim 76^{\circ}\text{C}$ was determined, while that of free erucic acid is 34°C . It was proposed also, as in the cases of other acids, that the hydroxamic acid method would be serviceable in the preparation of pure erucic acid.

Brassidohydroxamic acid, which is an ethylene isomer of erucahydroxamic acid, was also prepared as silver cluster of needles, m.p. $97\sim 98^{\circ}\text{C}$.

Studies on Ascorbic Acid. VIII.

The Relation between Ascorbic Acid and Vitamin A. (II).

(pp. 419~422)

By Kichinosuke FUJIMURA.

(Laboratory of Nutritional Chemistry, Dept. of Agriculture and
Chemical Institute, Kyoto Imperial University;

Received January 23, 1942.)

Dietary studies on the Increase of Utilizing Value of Northern Farm Animals.

V. Experiment on Fox with Hydrolyzed Products of Human Hair.

(pp. 423~426)

By F. TAKAHASHI and K. SHIRAHAMA.

(Department of Agriculture, Hokkaido Imperial University;
Received January 6, 1942.)

On the Synthesis of Amino Acid-glycosides. Part 1.

Synthesis of Tyrosine-N-glycosides.

(pp. 427~432)

By Y. INOUE and K. ONODERA.

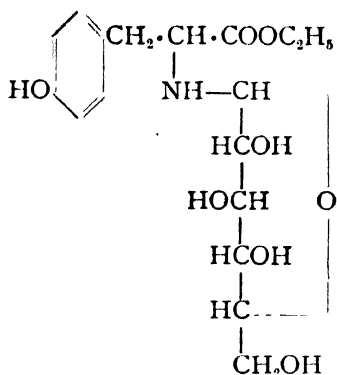
(Biochemical Laboratory, Department of Agriculture, Kyoto Imperial University;
Received February 13, 1942)

Although the presence of carbohydrates in proteins is well known, the manner of linkage of sugars as a constituent in protein molecules has been very little investigated. In the authors' laboratory, some glycosides were already isolated from proteins (unpublished), in which sugar and amino acid or peptide were combined together as glycoside and such linkage in proteins may be considered to occur widely in nature. In the present work, the authors undertook the serial synthesis of amino acid-glycosides, in two types i. e., N- and O-glycosides, for the purpose of the confirmation of chemical structure of isolated glycosides and the determination of biochemical natures of such glycosides.

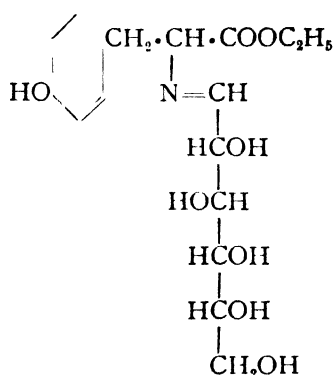
Tyrosine ethylester was condensed with sugar directly in absolute alcohol in the presence of trace of conc. HCl or glacial acetic acid. For instance, in 50 cc of abs. alcohol, 4.0 g of *l*-tyrosine ethylester and 3.2 g of glucose were suspended with one drop of glacial acetic acid and heated on the water-bath for about 80 min. At the end of this time, a clear solution was obtained and after evaporating in vacuum, the crystallization of the resulting syrup was attempted but hygroscopic powder was obtained. 3 g of the powder was acetylated in pyridine and after recrystallization, 2 g of pentaacetyl-tyrosine-ethylester-N-*d*-glucoside was obtained; melting pt. 140~141°, needles. By a similar process, N-*d*-mannoside, -*d*-galactoside, -*d*-fructoside, -*d*-arabinoside, -*l*-rhamnoside and -*d*-xyloside were prepared, but all of the glycosides except *d*-galactoside and *l*-rhamnoside were non-crystalline.

l-Tyrosinemethylester-N-*d*-glucoside, decomp. pt. 113°, needles; *l*-Tyrosinemethylester-N-*d*-glucoside + H₂O, decomp. pt. 110°, needles; *l*-Tyrosine-ethylester-N-*d*-galactoside, decomp. pt. 118~120°, needles; *l*-Tyrosine-ethylester-N-*l*-rhamnoside + H₂O m.p. 110~112°, needles.

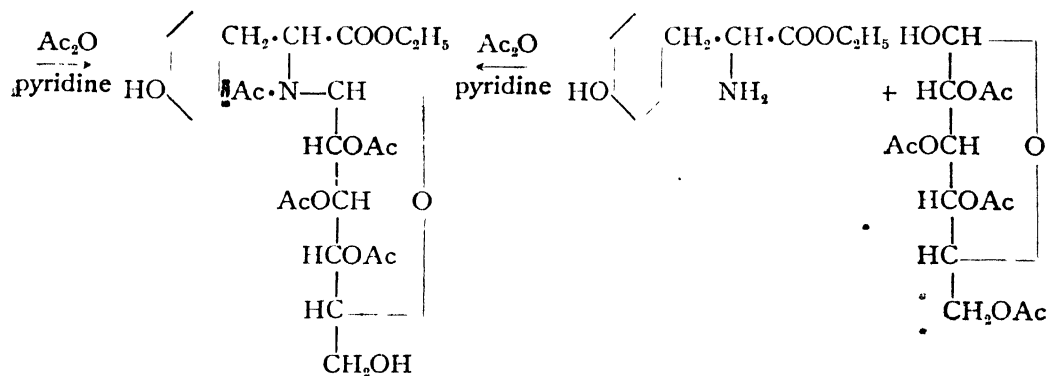
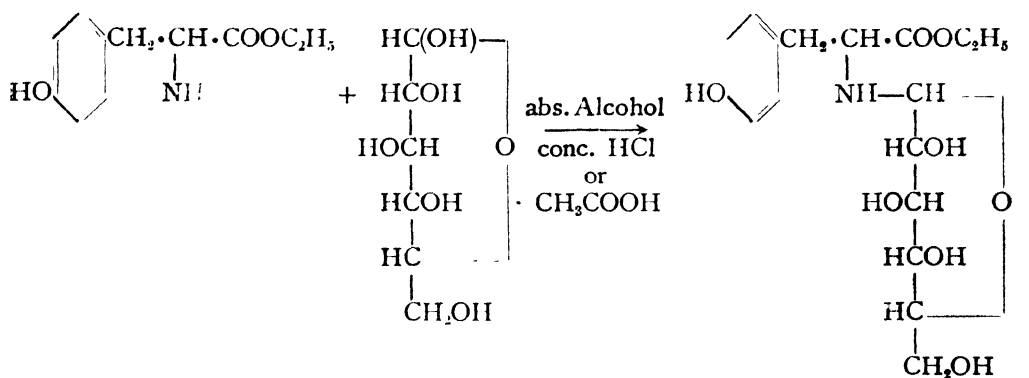
On the combination of amino group and carbonyl group of sugars, it may be possible to form either N-glycoside or Schiff's base; that is, sugar component remains in oxide ring form (I) or in open chain form (II)



(I) N-glucoside
(α or β)



(II) Schiff's base
(*cis* or *trans*)



pentaacetyl-*l*-tyrosine-
ethylester-N-*d*-glucoside

The authors confirmed their synthesized glycosides as N-glycosides by the fact that the determination of total acetyl radicles by Freudenberg's method indicates the presence of 5 acetyl groups in the molecule, while, by Kunz's method, the content of O-acetyl group was four. And at the same time, it was proved that the acetylated condensed product of 2,3,4,6- β -tetraacetylglucose and *l*-tyrosine-ethylester was identical with the above synthesized.

Dehalogenations of the Halogenated Sugar Alcohols. (Part 2~3.)

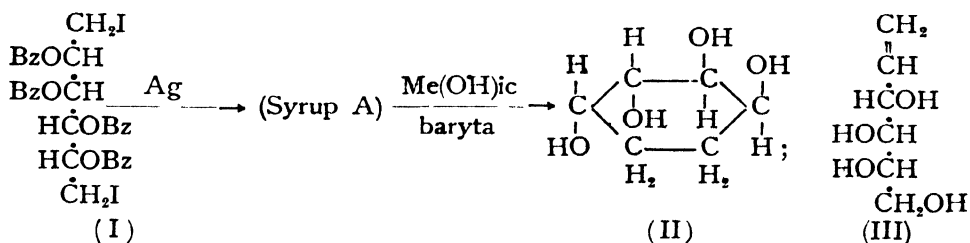
Part 2. Dehalogenation of 1,6-diiodomannitol by Molecular Silver.

(pp. 433~438)

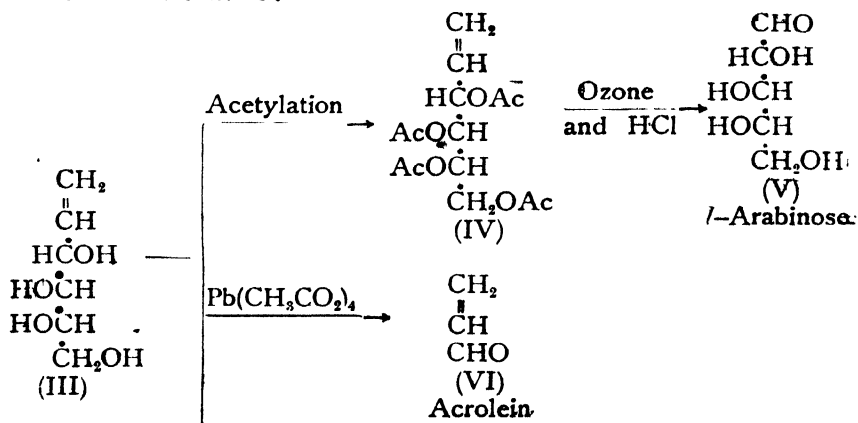
By Yasuji HAMAMURA.

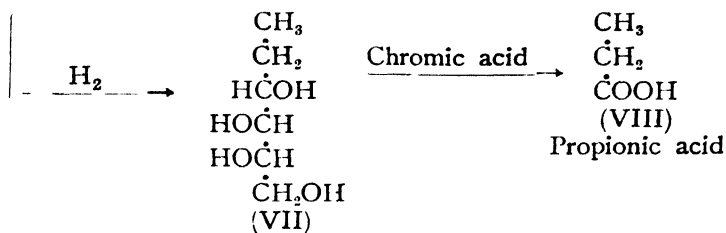
(Kpoto Sericultural college; Received March 2, 1942.)

The author once made an attempt to derive polyhydroxycyclohexane (II) from 1,6-diiodotetrabenzoyl-mannitol (I) by the action of molecular silver and succeeded in getting a crystal, m.p. 148°C., $[\alpha]_D = -27.00$, $C_6H_{11}O_4$, by hydrolysing the dehalogenation product with methyl alcoholic baryta. This substance had been believed by the author to be tetrahydroxy-mannocyclitol (II), but after repeated examinations it was shown that it was not tetrahydroxy-manno-cyclitol, but *l*-3,4,5,6-tetrahydroxy-mannohexene (1:2) (III).



The configuration of *l*-3,4,5,6-tetrahydroxy-mannohexene (1:2) may be demonstrated as follows:—



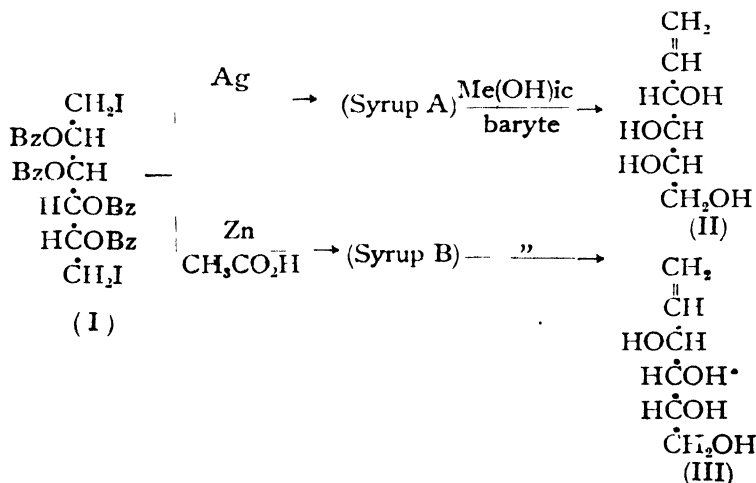


- IV. *l*-3, 4, 5, 6-tetracetyl-tetrahydroxyhexene (1 : 2), m.p. 79°C, $[\alpha]_D = -59.00^\circ$, C% 53.43, H% 6.25 (calc. C% 53.13, H% 6.38).
- V. *l*-Arabinose as *p*-nitrophenylhydrazone, m.p. 183°C, N% 14.59 (calc. N% 14.73). It is identified as natural arabinose by mixed test.
- VI. Acrolein as *p*-nitrophenylhydrazone, m.p. 158°C, N% 21.40 (calc. N% 21.95).
- VII. 3, 4, 5, 6-tetrahydroxy-mannohexane, m. p. 123~5°C, $[\alpha]_D = -24.4$ (in borax solution). C% 47.68, H% 9.18 (calc. C% 48.00 H% 9.33).
- VIII. Propionic acid as *p*-bromophenacyl ester, m.p. 61~62°C, C% 48.34, H% 3.95 (calc. C% 48.70, H% 4.08).

(1) V. IIAMAMURA: Proc. Imp. Acad. X, 459 (4934).

Part 3. Dehalogenation 1,6-diiodomannitol by Zinc with Acetic Acid.

With regard to the dehalogenation of 1,6-diiodotetrabenzoylmannitol (I) by molecular silver, the author reported in Part II of this series that he obtained *l*-



3, 4, 5, 6-tetrahydroxy-mannohexene (1 : 2) (II) by the hydrolysis of the benzoyl-ester. But now by using zinc with acetic acid as dehalogenating agent and otherwise proceeding in the same manner as in the above mentioned case, the

author has obtained the optical antipode of the previous case, that is, *d*-3,4,5,6-tetrahydroxy-mannohexene (1:2), m.p. 148°C, $[\alpha]_D = +27.00$ (III)

The comparison of these two substances is demonstrated as follows:—

| | <i>l</i> -Tetrahydroxyhexene (II) | <i>d</i> -Tetrahydroxyhexen (III) |
|-----------------------|-----------------------------------|-----------------------------------|
| m p. | 148.°C | 148°C |
| $[\alpha]_D$ | -27.00°C | +27 00°C |
| Acetylated, m. p. | 79°C | 79°C |
| „ $[\alpha]_D$ | -59° | -58 02°C |
| Oxidation by ozone | <i>l</i> -arabinose | <i>d</i> -arabinose |
| „ by $Pb(CH_3CO_2)_4$ | acrolein | acrolein |

(1) HAMAMURA J Agr. Chem Soc Japan, 18, 433 (1942)

Chemical Studies on Agricultural Insecticides. (Part 1~2.)

(pp. 439~450)

(Part 1.) On the Capillary Activity and Stability to Hard Water of Emulsifiers.

By Chiyoka MOURI and Seichi IZUME.

(Central Laboratory, South Manchuria Railway Company, Dairen;

Received February 9, 1942.)

The authors have made studies firstly on the capillary activity of various emulsifiers by the measurement of anti-kerosene interfacial tension with Hillyer's drop number method and surface tension with Du Nouy's tension balance, and secondly on the stability to hard water of soaps and on the protective properties of the deposit of calcium soaps in hard water. The results obtained are as follows:

1. The anti-kerosene interfacial tension is not always in accordance with the surface tension. Sodium and potassium salts of fatty acids showed different activity depending on the kind of original fatty acids used. Naphthenic acid soaps and resin soaps showed lower activity than fatty acid soaps, and sodium soaps showed a somewhat lower tension than potassium soaps at the same concentrations. The anti-kerosene interfacial tension of such detergents as Nekals, Igepons, and fatty alcohol sulfonates are very much more powerful than that of the soaps. Of the protective colloids, saponine and soybean lecithine showed no small activity, but these were inferior to the soaps.

2. Soaps always deposit calcium soaps at the hardness of 20° (by German degrees), but only the naphthenic acid soaps are very stable at the hardness of 70°.

3. The protective property of the deposit of calcium soaps in the hard water

of some of the detergents is remarkable, but showed no relationship with its stability to hard water. Protective colloids such as saponine, gelatine, sodium lignin-sulfonate and gum arabic showed very strong ability.

(Part 2.) On Stability to the Hard Water of Kerosene-Soap Emulsions.

The authors have investigated the stability to hard water of kerosene-soap emulsions with the following results:

1. The relationships between the concentrations of kerosene in kerosene-soap emulsions and their dispersion conditions in hard water are studied in the test tubes. If the content of kerosene is low, solid deposits are formed; on the other hand, if the content is high, many oily deposits are formed. The most suitable concentration is 0.25%.

2. The stability to hard water of kerosene-soap emulsions of various kerosene contents is tested. Solid or oily deposits are formed at the hardness above 30°, but creamings are formed only at the hardness under 30°.

3. The effects of protective colloids added to the solutions of kerosene-soap emulsions in hard water are compared. While the addition of such materials as saponine, sodium ligninsulfonate and gum arabic is very effective in promoting the stability to hard water of the emulsions, gelatine has very little effect.

Untersuehung über Fett und Öle der Getreidefenniche I. Freie Fettsäure.

(SS. 451~462)

Von Tetsujiro OBARA.

(In der Chem Abteilung der Landwirtschaftl. Erziehungsfachschule zu Tokyo,
Eingegangen am 6. 12. 1941.)

Der Fettol-Gehalt des Getreidefennichs ist viel größer als der der anderen Gramineae, und die Fettölmengen der Karyopse des Getreidefennichs betragen 5.0~6.5%; insbesondere die gereinigte Menge ist bedeutend. Eine Untersuchung über das Wesen des Getreidefennichfettöls ist aber im Schrifttum kaum zu finden. Ich habe, durch diese Tatsache veranlaßt, eine allgemeine Untersuchung über das Getreidefennichfettöl angestellt, den größten Wert auf die Zusammensetzung des neutralen Fettöls legend: daher habe ich zuerst ein Experiment über die Fraktionierung des Fettöls durch ein Lösungsmittel sowie über die freie Fettsäure angestellt und folgende vier Punkte klargemacht:

i) Das Getreidefennichfettöl gehört zum halbtrocknen Fett, die fraktionierte Teilung außer dem zum sechs eckigen blätterförmigen Kristall werdenden Teil, welcher in der Petroleum-Ätherlösung durch Lösung des Fettöls gesättigt wurde

und dem durch Aceton präzipitierenden Teil, wurde mittels Alkohol durchgeführt. In dieser Teilung, die mittels des 90% igen Alkohols ausgeführt ist, sammelt sich die freie Fettsäure, weiter werden von dieser Teilung die freie Fettsäure und das neutrale Fettöl getrennt.

Unter den Ausbeuten durch diese Experimente betragen der unlösliche fraktionierte Teil mittels des 99% igen Alkohols etwa 50%, der mittels des 90% igen Alkohols dagegen etwa 31%, der lösliche mittels des 90% igen Alkohols etwa 10% und der der freien Fettsäure beinahe 8%.

Dazu ist hier noch zu betonen, daß jede Teilung des neutralen Fettöls ihre eigene andersartige Eigenschaft habe.

ii) Die freie Fettsäure besteht aus etwa 11%iger fester Fettsäure und ungefähr 86%iger flüssiger Fettsäure.

iii) Die feste Fettsäure besteht meistens aus Palmitinsäure und enthält diejenige Säure, die für eine geringe Menge höherer Säure, d. h. für eine winzige Menge Arachinsäure gehalten wird.

iv) Die flüssige Fettsäure besteht aus 70%iger Ölsäure und 27%iger Linolsäure.

On the Manufacture of Artificial Fibres from Proteins. (Part II).

On the Artificial Fibres of Soy-bean Protein.

(pp. 463~466)

By Masami OKU and Yutaka HOSOKAWA.

(From the Chemical Fibre Laboratory, Ueda Imperial
College of Sericulture and Silk Industry;

Received January 31, 1942.)

Studies on Digestion of Soy-beans (Benzine Extracted) as Rice Substitute.

(pp. 467~495)

By T. CHACHIN and M. KUBO.

(Osaka Municipal Hyg. Lab.; Received January 28, 1942.)

The authors recommended the soy-beans extracted with benzine as the rice substitute.

The digestion coefficients in rice or 10% soy-beans mixed are as follow :

| | Protein % | Fat % | Carbohydrate % | Fibre % | Ash % | Calorie % |
|---------------------|--------------|----------|-------------------|------------|----------|--------------|
| Rice | 83.47 | 84.67 | 99.43 | 68.73 | 82.28 | 95.23 |
| 10% Soy-beans mixed | 84.20 | 84.52 | 99.39 | 68.31 | 85.02 | 95.41 |
| Rice | 83.50 | 84.63 | 99.49 | 66.54 | 81.18 | 95.59 |

Studies on the Components of the Bark of *Rhamnus japonica* (VI).

The Chemical Structures of α -Sorinin and α -Sorigenin.

(pp. 496~502)

By ZIRÔ NIKUNI.

(Agr. Chem. Laboratory, Tokyo Imp. Univ.; Received February 21, 1942.)

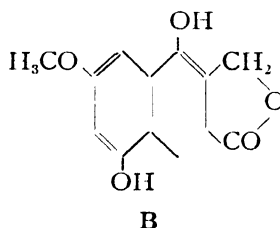
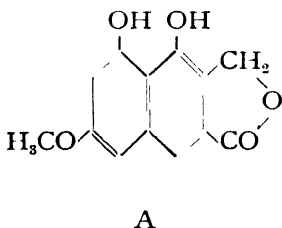
In the previous paper⁽¹⁾ it is reported that α -sorinin is the lactone of α -primverosido- α -methoxy-1 or 4-hydroxy-3-hydroxymethyl-2-naphthoic acid.

Kostanecki⁽²⁾, Perkin⁽³⁾ and others have found that it is very difficult to alkylate the hydroxyl group occupying the ortho-position relatively to the carbonyl or carboxyl group present in members of xanthone, flavone, anthraquinone, acetophenone and benzoic acid.

It thus appears that the free hydroxyl group of α -sorinin must be on 4 position of the naphthalene nucleus. Because this hydroxyl group is methylated very easily.

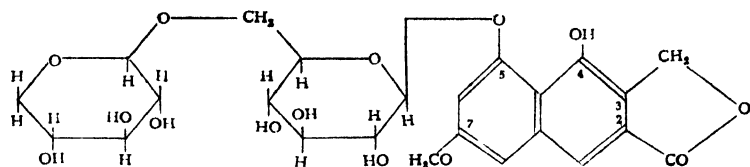
Then the oxidation of α -sorinin with potassium permanganate was tried. 2.0 g of the glycoside was dissolved in 100 cc dilute potassium hydroxide solution and drop by drop 140 cc of 3% potassium permanganate solution was added. The reaction mixture was acidified and extracted with ether. Faintly yellowish needles (m.p. 177~179°) were obtained from the extract by recrystallizations from toluene. Yield 41 mg. From the analytical results and absorptions spectrum, it was decided that this substance is either 5-methoxy-3-hydroxy-phthalic acid or 5-hydroxy-3-methoxy phthalic acid. On the other hand, this acid shows very intensive reddish violet colour reaction with ferric chloride solution. So it must be 5-methoxy-3-hydroxy-phthalic acid⁽⁴⁾.

To form 5-methoxy-3-hydroxy-phthalic acid by oxidation, α -sorigenin must have the structure of either A or B.

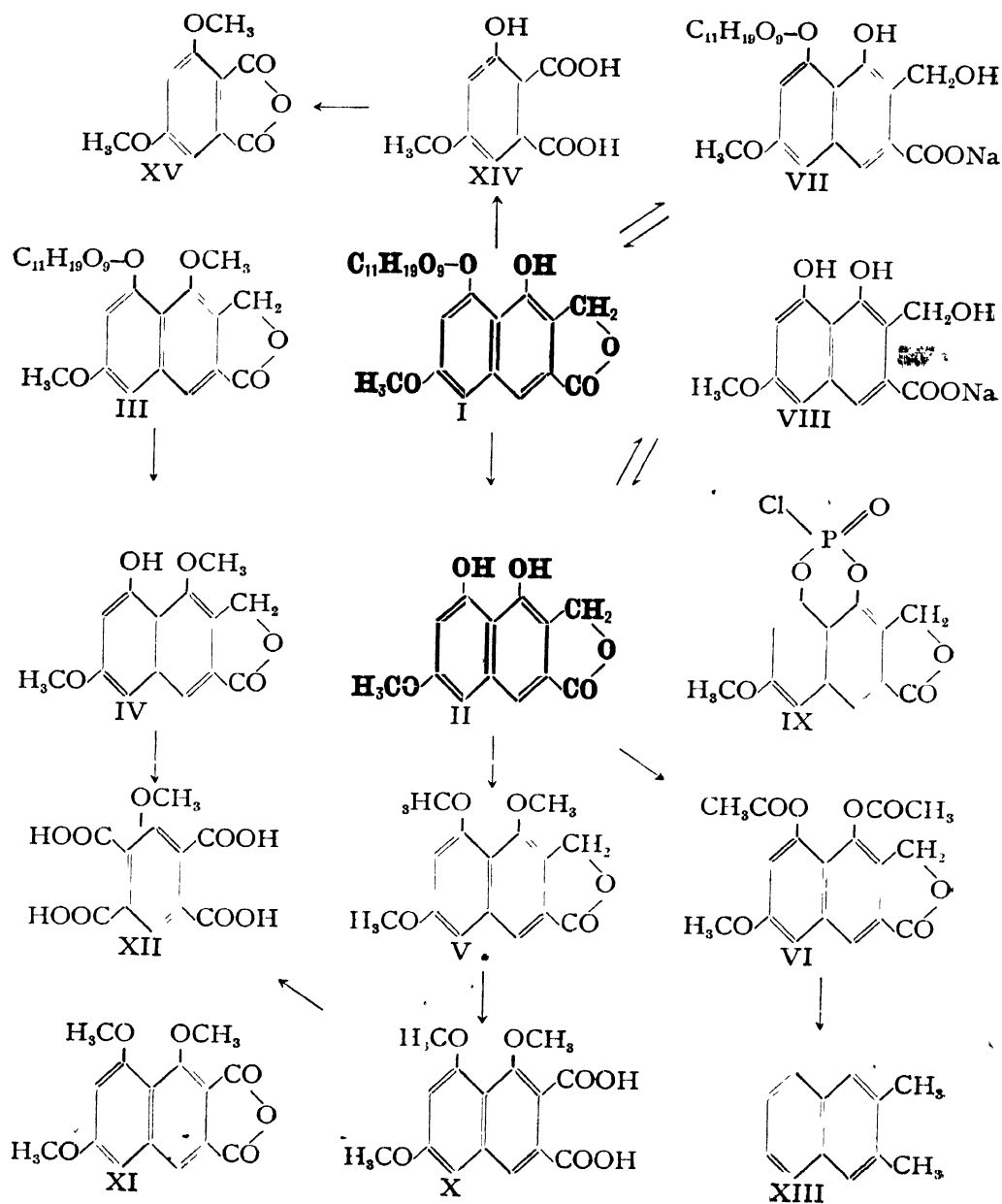


Then α -sorigenin was boiled with phosphor oxychloride according to Knauer's method⁽⁵⁾. Reddish brown crystals (m.p. 273°) were obtained. Thus it is clear that the two hydroxyl groups of α -sorigenin must be in peri (1,8) position of the naphthalene nucleus. And the sugar combines with the hydroxyl group of 5 position when it is the glycoside⁽¹⁾.

From these facts the structure of α -sorinin was decided as the lactone of 5-primverosido-7-methoxy-4-hydroxy-3-hydroxymethyl-2-naphthoic acid.



α -Sorinin



α -Sorinin and its derivatives are listed below. And the figures show the deriving process of these compounds. Among these compounds only 2,3-dimethylnaphthalene (XIII) and 3,5-dimethoxy-phthalic anhydride (XV) are known substances.

In conclusion the author desires to express his sincere thanks to Prof. Bunsuke SUZUKI for his kind guidance throughout this work, and to the Imperial Academy for a grant, which has in part defrayed the cost of this investigation.

| | | |
|----------|--|---------------------|
| (I) | α -Sorinin | m.p. 159° |
| (II) | α -Sorigenin | 227~229° |
| (III) | Methyl- α -sorinin | 242~243° |
| (IV) | Monomethyl- α -sorigenin | 197° |
| (V) | Dimethyl- α -sorigenin | 183.5~184.5° |
| (VI) | Diacetyl- α -sorigenin | 259° |
| (VII) | α -Sorinic acid Na-salt | 260~270° (blackend) |
| (VIII) | α -Sorigenic acid K-salt | above 280° |
| (IX) | α -Sorigenin-oxychlorphosphine | 273° |
| (X) | 4,5,7-Trimethoxynaphthalene-2,3-dicarboxylic acid | 263° |
| (XI) | Anhydride of 4,5,7-Trimethoxynaphthalene-2,3-dicarboxylic acid | 263~264° |
| (XII) | Monomethoxy-pyromellithic acid | 251° |
| (XIII) | 2,3-Dimethylnaphthalene | 90~96° |
| (XIV) | 5-Methoxy-3-hydroxy-phthalic acid | 177~179° |
| (XV) | 3,5-Dimethoxy-phthalic anhydride | 151~152° |

LITERATURE.

- (1) Nikuni: Bull. Agr. Chem. Soc. of Japan, **17**, 92 (1941).
- (2) Dreher, Kostanecki: B., **26**, 71 (1893).
- (3) Perkin: Soc., **71**, 812 (1897).
- (4) Asahina, Hayashi: B., **66**, 1023 (1933).
- (5) Knauer: B., **27**, 2565 (1894).

On the Tannin of the Leaves of *Lagerstroemia subcostata*.

(pp. 503~506)

By Minoru ISHII.

(Agricultural Chemical Institute, Taihoku Imperial University;

Received February 12, 1942.)

From the leaves of *Lagerstroemia subcostata* Kochne, which contain about 15% tannin in the dry matter, pure tannin and ellagic acid were isolated by the author. The tannin showed dextro rotation and could be decomposed neither by *Aspergillus niger* nor by emulsin. It was confirmed to be a diglucoside of luteoic acid by acid hydrolysis, which yielded ellagic acid and glucose in the molecular ratio

of 1 and 2. On the other hand, alkali hydrolysis of the methylated tannin gave tetramethoxy luteoic acid.

Untersuchungen über die Beziehungen von Bataten zur Alkoholproduktion. (III).

(SS. 507~520)

Von K. SUEMATU und M. UTIKOSI.

(The Institute of Reserch on Chemical Industry, Government-General
of Taiwan, Japan; Received January 6, 1942.)

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Enthymatic Studies on Exuvial Fluid of *Bombyx Mori* L (Silkworm). (Part III.)

Microscopical Observations on Enzymatic
Action at Moulting.

(pp. 521~523)

By Yasuji HAMAMURA and Syûsiro ITO,

(Kyoto Sericultural College; Received March 3, 1942.)

One of the authors (H)⁽¹⁾⁽²⁾ found enzymes, especially chitinase and protease, in the exuvial fluid of silkworm and at the same time glucosamin and amino acid in water extraction of the exuvia.

Now the authors succeeded in proving by microscopical observation of sections made of several stages of the sleeping period of silkworm, that enzymatic digestion takes place of the old skin of silkworm at moulting.

- (1) HAMAMURA, IIDA, and OTUKA: Bull. Agr. Chem. Soc. Jap., **16**, 905 (1940).
- (2) HAMAMURA, KANEHARA: Bull. Agr. Chem. Soc. Jap., **16**, 907 (1940).

Chemische Bestandteile des Tees. II. Mitteilung.

Theosterin und β -Amyrin.

(SS. 524~526)

Von Yaziro SAKATO.

(Aus d. Institut für Tee Kioto, Eingegangen am 11. 3. 1942.)

On the Alkaline Decomposition of Codeinone Methiodide and of 1-Bromo-sinomenene Methiodide.

(pp. 527~530)

By Kakuje GOTO.

(Kitasato Institute; Received March 20, 1942.)

Untersuchungen über die Beziehungen von Bataten zur Alkoholproduktion. (IV).

(SS. 531~534)

Von Y. TAKEDA, K. SUEMATU, und M. UTIKOSI.

(The Institute of Research on Chemical Industry, Government-General
of Taiwan, Japan; Received February 9, 1942.)

Chemical Studies on Agricultural Insecticides.

(pp. 535~542)

(Part 3.) On the Component Systems of Kerosene Miscible Oil Emulsions Containing Soap as Emulsifier.

By Chiyoka MOURI and Hiroshi NORIMATSU.

(Central Laboratory, South Manchuria Railway Company, Dairen;
Received March 3, 1942.)

As the fundamental studies on the preparation of kerosene miscible oil containing soap as emulsifier, the authors have studied the four-component systems, consisting of kerosene (b. p. 150~200°C), potassium stearate, water and such mutual solvents as *p*-cresol, amyl alcohol, benzyl alcohol and cyclohexanol, by the measurement of transition points from the heterogeneous to the homogeneous system. The quantity of the mutual solvent necessary to prepare a homogeneous system decreases rapidly to the minimum point and then increases gradually with increasing amounts of water.

(Part 4.) On the Stability to Hard of Kerosene Miscible Oil Emulsions Containing Soap as Emulsifier.

The authors have studied the stability to hard water of kerosene miscible oil emulsions containing soap as emulsifier and compared with that of the kerosene soap emulsions mentioned in the previous report (part 2), and the following results have been obtained.

1. The relation between the concentrations of kerosene in kerosene miscible oil emulsions and their dispersion condition in the hard water of 70° (in German degrees) have been found to be similar to that in the case of kerosene soap emulsions. When the content of kerosene is too low, solid deposits are formed; while when its content is too high, oily substances are separated out. The most suitable concentration of kerosene is found to be 1.00~1.50 % when the concentration of soap (potassium stearate) is 0.25 %.

2. The stability to hard water of kerosene miscible oil emulsions of various kerosene contents has been tested. At the hardness above 30°, solid or oily substances are separated out, but the latter is formed at the kerosene contents of 2.50 %; at the hardness under 30° creamings are formed when its contents are above 1.00 %.

3. Among the mutual solvents tested such as *p*-cresol, cyclohexanol, phenol, benzyl alcohol and amyl alcohol, cyclohexanol and amyl alcohol are superior to the others in promoting the stability to hard water of emulsions.

Studies on the Yeasts Found in "Miso."

(pp. 543~554)

By Masatoshi MOGI.

(The Brewing Laboratory, Noda Syōyū Co., Ltd., Tiba-ken;
Received February 16, 1942.)

Researches on Ground Wood Pulp. (Part VIII).

Effect of Grinding Temperature.

(pp. 555~563)

By Yoshitsugu KIMURA.

(Kyōto Imperial University; Received February 16, 1942.)

On some Substitutes of Rochelle-salt in Fehling's Solution.

(pp. 564~566)

By Masakazu YAMADA and Itiro TAMAI.

(Government Institute of Brewing, Tokyo; Received March 2, 1942.)

1. The property of dissolving cupric hydrate was tested in strong alkaline solution.

Positive: tartaric acid, citric acid, glyceric acid, gluconic acid, lactic acid, mannit, glycerin, 2,3-butylene-glycol and ethylene glycol.

Negative: acetic acid, succinic acid, adipic acid, malic acid, and ethyl alcohol.

2. The property may be related to the presence of two or more OH groups with the exceptions of lactic and citric acids.

3. As the substitute of Rochelle salt (173 g) in 1 l of Fehling's solution, 70 cc of glycerin, 60 g of mannit, 80 g of tartaric acid with 50 g of NaOH, 40 cc of glyceric acid with 50 g of NaOH, 175 cc of lactic acid (75 %) with 100 g of NaOH and 300 cc of ethylene glycol can be used.

Gluconic acid or 2,3-butylene glycol is not suitable for this purpose because they may produce some decomposition products of reducing property in heating.

4. 200 cc of glycerin, 100 g of mannit, 200 cc of ethylene-glycol and 60 g of tartaric acid can also be used as the substitute for Rochelle salt (50 g) in 1 l of Nylander's reagent.

Researches on Bamboo in Taiwan as a Raw Material for Pulp. (Part VII.)

On the Two Step Cooking of "Keitiku."

(pp. 567~571)

By Minoru TUTIYA and Yoshiteru KATO.

(Industrial Research Institute of Taiwan; Received February 27, 1942.)

Bamboo (or Gramineae) contains, as a non-cellulose substance, a larger quantity of pentosan, than that of Coniferae, i. e., "Keitiku" contains about 24%. The pulp obtained by single cooking in Mg-sulphite solution contains about 10% pentosan in so called " α -cellulose" which amounts to more than 90%. This pulp is bleachable and good for paper-making, but is not suitable for artificial silk pulp in the point of pentosan content. We attempted two step cooking for preparing of the artificial silk pulp. In the first step, using Ca-sulphite solution, we eliminated most of the pentosan in chip, and in the next step, by caustic soda solution, obtained the desired pulp. The yield in the first step was about 70%, containing about 10% pentosan, and the final product was about a quarter of the starting substance.

Our experiments led us to conclude as follows:—

1. The most reasonable method to obtain good pulp from bamboo (or Gramineae), which contains a large quantity of pentosan, is to expel most of the pentosan in the first cooking and then to obtain the wanted pulp at the second cooking.
2. Since the deduction ratio of pentosan is proportional to the concentration of acid, we can so regulate the treatment to reduce the quantity of pentosan as desired in pretreated substance.
3. The preferable conditions of the first cooking are at 150°C for 2 hrs., using Ca-sulphite solution far less than 1% total SO_2 , then we can obtain a substance with the pentosan content like that of Coniferae.
4. If we operate at ordinary pressure, sulfuric acid is more favourable than sulphite solution.

Dietary studies on the Increase of Utilizing Value of Northern Farm Animals.

VI. On the Effect of Feeding with Hydrolyzed Products of Human Hair upon Sheen and Pregnancy of Fox.

(pp. 572~576)

By E. TAKAHASHI and K. SHIRAHAMA.

(Department of Agriculture, Hokkaido Imperial University; Received January 6, 1942.)

Studies on the Lactogenic Factor in Soy-beans.

VI. The Effect of the Isolated Crystal on Lactation in Rats.

(pp. 577~580)

By Yosaburo IWASA.

(Dept. of Food Chemistry, Osaka Municipal Hygienic Lab.; Received February 21, 1942.)

Dehalogenations of the Halogenated Sugar Alcohols. (Part IV.)

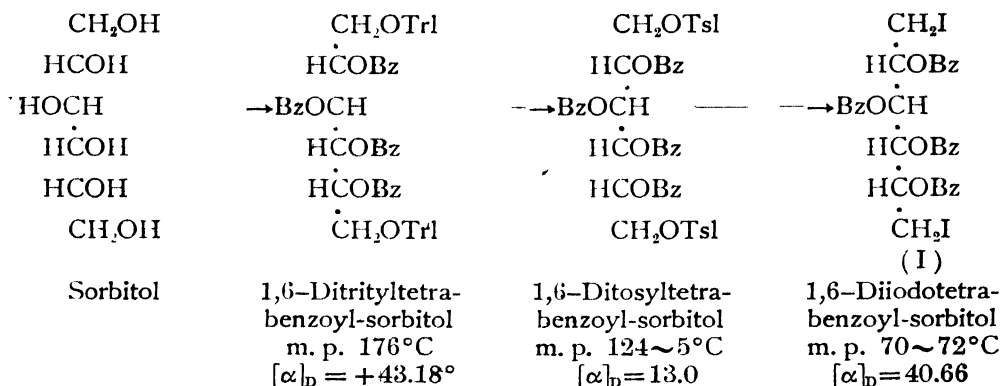
Dehalogenation of 1,6-Diiodotetrabenzoyl-sorbitol by
Molecular Silver and Zinc with Acetic Acid.

(pp. 581~583)

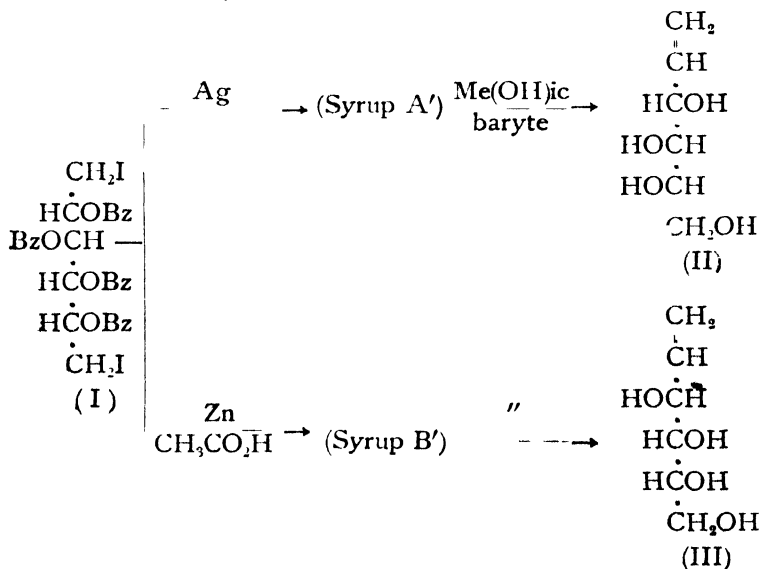
By Yasuji HAMAMURA.

(Kyoto Sericultural College; Received March 2, 1942.)

1,6-Diiodotetrabenzoyl-sorbitol (I) was prepared as follows:—



By dehalogenating this substance (I), by molecular Ag and Zn with CH₃COOH respectively, and afterwards hydrolysing the halogenation products in the same way as in the formerly reported case of mannitol, the author has obtained *l*-3,4,5,6-tetrahydroxymannohexene (1:2) (II) and its optical antipode (III) in the same way. The yield, however, was much smaller in comparison with the corresponding cases of mannitol:—



On the Production of 2, 3-Butylene Glycoll and Ethyl-alcohol from Pentose by Fermentation.

(pp. 584~586)

By Jiro YANAI.

(Agricultural Chemical Laboratory, Tokyo Imperial University; Received March 6, 1942.)

Studies on the Value of Chemicals for *Juncus effusus* L. var. *decipiens* BUCH. IV.

On the Relative Value of Ammoniac and Nitric Nitrogen,
and also of the Influence of Manuring Time.

(pp. 587~594)

By H. SUTOH.

(The Simane Prefectural School of Agriculture and Forestry at Masuda, Simane, Japan;

Received February 17, 1942.)

A report has already been made by the author on the relative value of different kinds of nitrogen compounds. In this paper the results of the experiments carried on as to the relative value of $\text{NH}_4\text{-N}$ and $\text{NO}_3\text{-N}$ as manure for the rushes as well as the influence of the time in which the manuring was done will be presented. Ammonium sulphate and sodium nitrate were used in the experiments as

Table Results of experiments.

| Items. | Lots. | A [IV. 20] | | B [IV. 30] | | C [V. 7] | | D [V. 14] | | No-N. | No-manure. | Added NaCl. |
|---|-------|------------|---------|------------|---------|------------|---------|------------|---------|-------|------------|-------------|
| | | Ammo-niac. | Nitric. | Ammo-niac. | Nitric. | Ammo-niac. | Nitric. | Ammo-niac. | Nitric. | | | |
| Fresh stems (weight) | | 100 | 45 | 75 | 28 | 43 | 30 | 64 | 23 | 5 | 4 | 91 |
| Air-dried stems (total) | | 100 | 46 | 69 | 28 | 40 | 30 | 56 | 23 | 6 | 4 | 86 |
| (over 45 cm) | | 100 | 38 | 62 | 17 | 26 | 24 | 47 | 15 | 0.4 | 0 | 87 |
| (under 45 cm) | | 100 | 80 | 98 | 78 | 104 | 60 | 98 | 59 | 30 | 20 | 81 |
| Number of stems (total) | | 100 | 57 | 79 | 40 | 56 | 41 | 77 | 32 | 12 | 10 | 93 |
| (over 45 cm) | | 100 | 41 | 62 | 20 | 29 | 24 | 51 | 17 | 0.5 | 0 | 89 |
| (under 45 cm) | | 100 | 85 | 109 | 75 | 107 | 72 | 125 | 59 | 32 | 28 | 100 |
| (over 30 cm) | | 100 | 54 | 69 | 35 | 49 | 31 | 63 | 26 | 7 | 3 | 87 |
| Tillering (multiples compared to number of young plants transplanted) | | 13 | 7 | 9 | 4 | 6 | 4 | 8 | 3 | | | 11 |
| (over 30 cm) | | | | | | | | | | | | |
| (over 45 cm) | | 11 | 5 | 7 | 2 | 3 | 3 | 6 | 2 | | | 10 |
| Mutual index (weight) | | 100 | 42 | 100 | 36 | 100 | 73 | 100 | 34 | | | |

nitrogen sources. The crop was manured at the rate of 36 kg. of N_2 , per Tan 20 kg. of P_2O_5 per Tan and 25 kg. of K_2O per Tan.

Only a quarter part of the total nitrogen was applied each time on the following dates.

A [IV. 20] lot. (IV. 20, V. 5, V. 30 and VI. 13).

B [IV. 30] lot. (IV. 30, V. 14, VI. 9 and VI. 27).

C [V. 7] lot. (V. 7, V. 22, VI. 20 and VII. 7).

D [V. 14] lot. (V. 14, V. 30, VI. 27 and VII. 14).

Several lots of pots bearing the above dates, of no-N and no-manure as controls were set up in a greenhouse.

The condition of growth, yield and quality of the rushes were investigated. Young plants of the rush were transplanted in Wagner's pots (in sand culture) on March 17, 1938, and harvested on August 1, 1938.

All rushes in the lots of NH_4-N were observed to have grown better than those in the NO_3-N -lots. The comparative yields and other data are presented in the above table.

The ammoniac nitrogen is more effective than the nitric nitrogen for the rush plants. This crop, therefore, is regarded as an ammonium-plant.

These data also suggest that for the best growth of the rush in its quality as well as yield, the first spring manuring should always be done during the most favourable period extending from the middle to the end of April but never later.

Some Comparisons of Estimation Procedure of Lignin Bodies in Tundra.

(pp. 595~606)

By Sin-iti HONDA and Kazuo HAGIWARA.

(Institute for Chemistry, Kyoto Imp. University; Received February 14, 1942.)

Writers had compared the estimation methods of lignin bodies in Tundra, peat grown at Kabafuto, Nippon, with following three method; König's 72% H_2SO_4 method, Willstatter-Zechmeister's HCl method and Ross-Potter method. From these analytical results, writers has recommended the König's 72% H_2SO_4 method hydrolysing 48 hours under ice chest, because the simplicity and exacticity of procedure from the writers' experiences.

Some grams of lignin bodies isolated from the tundra was compared with lignin of Mizugoke, *Sphagnum*, and writers had gained a knowledge, that the lignin bodies are connected with the mother plants of tundra for the chemical analysis, i. e.. *Sphagnum* plants consist largest parts of tundra, which are difficult decomposition to peat.

On the Manufacture of Acetone and Butanol by Fermentation.

(1) A Study of the Acetone-butanol Fermentation of Sweet Potato.

(pp. 607~618)

By H. OKEDA, N. SOWA, A. WATANABE, and Y. HASHIMOTO.

(Nippon Soda Co. Ltd.; Received March 16, 1942.)

On the Acid Fermentation of *Aspergillus Niger*. (Part II.)

(pp. 619~624)

By Kinichirô SAKAGUCHI and Sinitirô BABA.

(Agricultural Chemical Laboratory, Tokyo Imperial University; Received March 6, 1942.)

From the fact that citric acid is easily formed from various carbon sources of $C_2 \sim C_6$ it may be assumed that the whole course of the fermentation involves two fundamental processes, one of which is the cleavage or breakdown process in which the molecules of the substrate may be divided into an intermediate product having less carbon atoms, and the other process being the combination or condensation of the cleavage products to form citric acid. The authors have intended to investigate these two fundamental processes in citric acid formation from glucose by two strains of *Asp. niger* (*Asp. niger* var. No. 2 and *Asp. niger* var. No. 25) by the use of specific inhibitors for various enzyme systems. The summary of the results obtained is as follows: —

1) The rates of inhibition for citric acid or oxalic acid fermentation are shown below.

| Inhibitors | For citric acid fermentation. | | For oxalic acid fermentation. | |
|---------------------|-------------------------------|------------------------|-------------------------------|------------------------|
| | Rates of inhibition. | Conc. of the inhibitor | Rates of inhibitions. | Conc. of the inhibitor |
| Monoiod acetic acid | 87% | M/200 | 100% | M/20,000 |
| Na-fluoride | 100 | M/1,000 | 100 | M/1,000 |
| Benzolsulfonic acid | 100 | M/1,000 | 100 | 3M/1,000 |
| Na-arsenate | 100 | M/1,000 | 100 | M/100 |
| Na-arsenite | 100 | M/1,000 | ※ The stimulating effect. | M/1,000 |
| Methylene blue | 150 | M/10,000 | ◎ The stimul. eff. | M/10,000 |

※ The yield of oxalic acid markedly increased by about three times that of the control culture.

◎ The yield of oxalic acid being about twice.

2) Citric acid fermentation was inhibited less effectively by benzol sulfonic acid and monoiod acetic acid than was oxalic acid fermentation, while Na-arsenate poisons the citric acid fermentation predominantly at the concentrations given above.

3) The enzyme systems of citric acid fermentation were selectively inhibited by the addition of Na-arsenite or methylene blue. At the same concentrations of these poisons the production of oxalic acid was strikingly increased.

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

*(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Blätteralkohol. VI. Mitteilung⁽¹⁾

Über die katalytische 1 Mol. Hydrierung von Hexin-3-ol-1
mittels Platinoxid.

(SS. 625~628)

Von Sankiti TAKEI and Minoru ÔNO,

(Aus d. Agrikulturchem. Institut d. Universität zu Kyoto,
Eingegangen am 13. März, 1942.)

Unseren früheren Arbeiten⁽²⁾ zufolge kann man bei der katalytischen 1 Mol. Hydrierung von Hexin-3-ol-1 mittels Pd-BaSO₄ je nach den Temperaturbedingungen Blätteralkohol (*trans*-Hexen-3-ol-1) oder sein Isomer (*cis*-Hexen-3-ol-1) gewinnen. Es war für uns nun von Interesse, ob man das gleiche Ergebnis erzielen konnte, wenn man in dieser Reaktion statt Pd-BaSO₄ als Katalysator PtO₂ verwendet. Zunächst haben wir die 1 Mol. Hydrierung des Hexin-3-ol-1 mittels PtO₂ bei -19° durchgeführt; dabei wurde ausser dem Blätteralkohol (ca. 40%) ein neues Hexenol (ca. 60%) gewonnen. Bei Anwendung einer höheren Reaktionstemperatur (60°) ergab sich aber nur das neue Hexenol.

Das Hexenol riecht sehr ähnlich wie der Blätteralkohol und liefert Allophanat vom Schmp. 129°, Anthrachinon- β -carbonsäure-ester vom Schmp. 61° und 3,5-Dinitrobenzoesäure-ester vom Schmp. 37°. Bei der KMnO₄-oxydation wurde das Hexenol quantitativ in Essigsäure und Bernsteinsäure gespalten.

Auf Grund dieser Ergebnisse kann man feststellen, dass das Hexin-3-ol-1 durch katalytische 1 Mol. Hydrierung mittels PtO₂ bei tiefer Temperatur in *trans*-Hexen-3-ol-1 und bei höherer in *Hexen-4-ol-1* übergeht.

Schrifttum.

(1) V. Mitteil: J. Agr. Chem. Soc. Japan, **18** (1942), 119.

(2) IV. Mitteil: J. Agr. Chem. Soc. Japan., **16** (1940), 772.

Studies on the Yeasts Found in "Miso."

(pp. 629~641)

By Masatoshi MOGI.

(The Brewing Laboratory, Noda Syôyû Co., Ltd., Tiba-ken;
Received February 16, 1942.)**Studies on Methionine and its Derivatives. (V).
Studies on Utilization of Methionine.**

- (1) On the Nutritive Value of Modified Milk Powders
(Preliminary Experiment.)
- (2) Use of Methionine in the Preparation of Biscuit
(Preliminary Experiment.)

(pp. 624~650)

By Yoshio TSUCHIYA and Toshi ISOBE.

(S. Suzuki and Co., Ltd.; Received March 24, 1942.)

Studies on Grape Seed Oil.

(pp. 651~654)

By Kunio ISHIMARU.

(The Institute of Physical and Chemical Research; Received March 11, 1942.)

**Untersuchungen über die Beziehungen von Bataten zur
Alkoholproduktion. (V.)**

(SS. 655~664)

Von Y. TAKEDA, K. SUEMATU und M. UTIKOSI.

(The Institute on Chemical Industry, Government-General of Taiwan, Nippon;
Received March 9, 1942.)**Dehalogenations of the Halogenated Sugar Alcohols. (Part V.)**

The Structure of Bouchardt's Dichlorodulcitol.

(pp. 665~668)

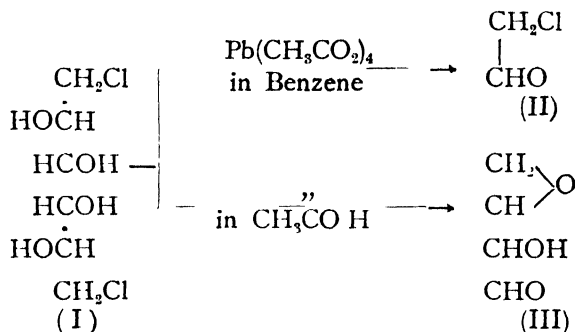
By Yasuji HAMAMURA.

(Kyoto Sericultural College; Received March 2, 1942.)

The author tried to prepare 1,6-diiododulcitol in the same manner as in

the cases of mannitol and sorbitol. The attempt, however, could not succeed because dulcitol does not act on tritylchloride.

The author recollected that Bouchardt had prepared⁽¹⁾ dichlordulcitol (I) from dulcitol and conc. hydrochloric acid, and also dichlormannitol in the similar way. The position of chlorine atoms of the latter has already been determined as 1 and 6 of mannitol by F. Micheel,⁽²⁾ but the former has not yet been determined. The author infers the positions of these chlorine atoms to be also 1 and 6 from the experiments, as follows:—



(II) Monochloracetaldehyde as dinitrophenylhydrazone, m. p. 154~5°C N% 22.24 (calc. N% 22.66).

(III) Anhydrothreose as *p*-nitrophenylosazone (under reexamination) decomposed over 300°C, C% 51.73, H% 4.12 N% 22.30 (calc. C% 51.73, H% 3.78, N% 22.70).

(1) Bouchardt: Am Chem Phs., 4 (1872), 27, 145, 168

(2) F. Micheel: Ann, 496 (1932), 77.

On the Chemical Studies of the Baggasse Pulp. (10).

(pp. 669~672)

By T. TADOKORO and M. NISHIDA.

(Hokkaido Imperial University; Received March 19, 1942)

Distribution of Ascorbic Acid in Plant Materials of North Nippon. I.

(pp. 673~689)

By Hisayosi IWATA, Kyo ITO, and Goro MAESAWA.

(Morioka Imperial College of Agriculture and Forestry; Received January 16, 1942.)

Chemical Studies on Agricultural Insecticides. (Part 5).

On the Effect of Protective Colloids on the Dispersion of Insecticides and Fungicides in Water.

(pp 690~696)

By Chiyoka MOURI and Hiroshi NORIMATSU.

(Central Laboratory, South Manchuria Railway Company, Dairen ;

Received March 20, 1942.)

The authors have made studies on the effects of such protective colloids as saponin, sodium ligninsulfonate, gelatine, gum arabic, etc., on the colloidal dispersion of insecticides and fungicides and obtained the following results.

1. The protective properties of these materials on the coagulation of congo rubin sol are shown to be in the following order :

gelatine > sodium ligninsulfonate > saponin.

Gum arabic has shown a small effect.

2. On the separating out of calcium soap in hard water, sodium ligninsulfonate has the largest protective effect. When the concentration of soap (sodium palmitate) in hard water of 30°, 50°, 100°, or 140° (in German degree), is in every case 0.25%, the sufficient concentration of the sulfonate to give the protective effect in each of the above mixtures is 0.0075%, 0.025%, 0.05%, or 0.1%, respectively.

3. On the dispersion of kerosene miscible oil emulsion in hard water corresponding to 70°, 100°, or 140, containing a soap (sodium palmitate) concentration of 0.25%, sodium ligninsulfonate is effective at concentrations of 0.05%, 0.1%, or 0.1~0.25%, respectively.

4. To prevent separating out of copper soaps, sodium ligninsulfonate has been found most effective while gum arabic shows a moderate effect. When the concentration of copper soap (cupric palmitate) is 0.5%, sodium ligninsulfonate at the concentration of 0.05% is sufficient.

5. To prevent the separation of cupric hydroxide in water, corresponding to the concentration of 0.1% of $\text{Cu}(\text{OH})_2$, sodium ligninsulfonate is most effective and is sufficient when its concentration is 0.1%.

On the Manufacture of Acetone and Butanol by Fermentation. (2).

(pp. 697~706)

By H. OKEDA, N. SOWA, A. WATABE, and Y. HASHIMOTO.

(Nippon Soda Co., Ltd.; Received March 16, 1942.)

Untersuchungen über die Verwitterung der Eruptivgesteine. VIII.

Neue Farbenreaktionen zum Nachweis der Tonmineralien.

(SS. 707~713)

Von Mituru HARADA.

(Landwirtschaftliche Hochschule uz Tottori.

Eingegangen am 16. 3. 1942.)

Der Verfasser hat folgende Farbenreaktionen zum Nachweis der Tonmineralien gefunden.

I. Nachweis von Montmorillonit

(a) Paraphenylendiamin-Methode

Versetzt man 1 g der Montmorillonit enthaltenden Probe mit 5 cc 2%iger Boraxlösung und 0,02 g Paraphenylendiamin-hydrochlorid (oder Paraphenylendiamin), wird die Probe tiefblau gefärbt. Sauert man das Gemisch mit verdünnter Salzsäure an, färbt die Probe sich rot.

(b) Metol-Methode

Versetzt man 1 g Probe mit 5 cc 0,5% iger Metollösung, 5 cc 10%iger Natriumacetatlösung und 0,01 g MnO_2 , wird der Montmorillonit tiefblau gefärbt.

(c) Neue Benzidin-Methode

Die Anwesenheit von Montmorillonit kann man durch die tiefe Blaufärbung erkennen, die auf Zugabe von Ammoniakwasser und Benzidinhydrochloridlösung (oder Benzidinlösung) zur Probe entsteht. Diese Reaktion ist sehr empfindlich. Ohne Ammoniak wird durch MnO_2 in der Probe das Gemisch auch blau gefärbt.

II. Nachweis von Halloysit und Kaolinit.

MnO_2 -Benzidin-Methode

Wenn man 1 g Probe mit 0,01 g MnO_2 und 5 cc zitronensäurer Benzidinlösung (0,1 g Benzidinhydrochlorid oder Benzidin, 10 g Zitronensäure, 100 cc Wasser) versetzt und vermischt, werden Halloysit und Kaolinit violett gefärbt. Der Nachweis des Kaolinit wird nach der Beseitigung des Halloysits gemacht: die Probe wird mit konzentrierter Salzsäure erhitzt, filtriert, bis zum Verschwinden der sauren Reaktion ausgewaschen, und dann wird der Rückstand, der Komplex B enthält, mit MnO_2 und der Benzidinlösung behandelt. Nach der Salzsäurebehandlung fällt diese Reaktion bei der nur Halloysit enthaltenden Probe negativ aus.

Der Gehalt an Komplex A_1 , $A_2^{(1)}$ und B, das Mol-Verhältnis von $\text{SiO}_2/\text{R}_2\text{O}_3$ und die Farbenreaktion der Tonmineralien in verschiedenen Böden aus Eruptivgesteinen sind in der folgenden Tabelle dargestellt. Der Boden, dessen Komplex B das Verhältnis von $\text{SiO}_2/\text{R}_2\text{O}_3$ ca. 3 hat, zeigt die Farbenreaktion von Montmorillonit und Kaolinit. Komplex B, der das Mol-Verhältnis von ca. 2 hat, zeigt die Kaolinit-Reaktion. Der Boden, der an Komplex A_2 reich ist, zeigt die Halloysit-Reaktion deutlich. Der nur Komplex A_1 enthaltende Boden hat keine Farbenreaktion.

**Komplex A₁, A₂, B und Tonmineralien
in den Böden aus Eruptivgesteinen.**

(O = Oberhorizont, M = Mittelhorizont, U = Unterhorizont)
(Mo = Montmorillonit, Ha = Halloysit, Ka = Kaolinit)

| | | Komplex A ₁ (%) | Komplex A ₂ | | Komplex B | | Tonmineralien |
|-----------------------------|-----|----------------------------------|---|---|---|---|---------------|
| | | | SiO ₂ + R ₂ O ₃ (%) | SiO ₂ R ₂ O ₃ | SiO ₂ + R ₂ O ₃ (%) | SiO ₂ R ₂ O ₃ | |
| Granitboden | (1) | 0,40 | 0,16 | 2,18 | 27,64 | 3,36 | Mo, Ka |
| | (2) | 1,42 | 11,93 | 1,94 | 20,52 | 1,84 | Ha, Ka |
| | (3) | 1,75 | 20,50 | 2,20 | 24,16 | 1,96 | Ha, Ka |
| Quarztrachyt- boden (1) | O | 0,22 | 7,53 | 2,39 | 26,57 | 2,84 | Mo, Ka, Ha |
| | M | 0,26 | 6,96 | 1,87 | 29,07 | 3,08 | Mo, Ka, Ha |
| | U | 0,38 | 9,02 | 2,43 | 11,83 | 3,46 | Mo, Ka, Ha |
| Quarztrachyt- boden (2) | O | 0,45 | 10,00 | 2,01 | 15,84 | 2,06 | Ha, Ka |
| | U | 0,50 | 14,75 | 1,97 | 18,74 | 2,29 | Ha, Ka |
| Dioritboden | | 1,36 | 16,59 | 2,22 | 15,10 | 1,87 | Ha, Ka |
| Basaltboden (1) | O | 1,20 | 44,01 | 1,78 | 16,30 | 1,89 | Ha, Ka |
| | M | 1,50 | 53,20 | 1,95 | 5,66 | 1,82 | Ha, Ka |
| | U | 2,03 | 65,64 | 2,05 | 4,41 | 1,84 | Ha, Ka |
| Basaltboden (2) | O | 2,43 | 8,43 | 1,91 | 46,64 | 1,95 | Ha, Ka |
| | M | 2,00 | 17,53 | 1,91 | 39,14 | 1,90 | Ha, Ka |
| | U | 2,05 | 18,32 | 1,89 | 1,07 | 5,11 | Ha, (Mo) |
| Basaltboden (3) | O | 1,85 | 25,15 | 1,92 | 15,03 | 1,88 | Ha, Ka |
| | M | 2,26 | 35,08 | 1,92 | 12,53 | 1,90 | Ha, Ka |
| | U | 2,40 | 25,51 | 1,81 | 6,04 | 2,61 | Ha, Ka, (Mo) |
| Augitandesitboden | O | 1,88 | 44,40 | 1,73 | 12,35 | 2,02 | Ha, Ka |
| | U | 2,26 | 62,96 | 1,95 | 2,97 | 1,64 | Ha |
| Hornblende- andesitboden | O | 14,64 | 8,18 | 1,79 | 1,39 | 2,22 | Ha |
| | U | 1,83 | 1,85 | 2,37 | 0,15 | 2,05 | Ha |
| Vulkanischer Boden | O | 2,35 | 14,03 | 1,99 | 7,26 | 1,96 | Ha, Ka |
| | U | 27,22 | 1,22 | 2,16 | — | — | — |

Schrifttum.

- (1) M. Harada: Bulletin of Agr. Chem. Soc. of Japan, 16 (1940), 77.

Studies on the Components of the Bark of *Rhamnus japonica* (VII).

The Chemical Characters of the Lactone Ring of
 α -Sorinin and its Derivatives.

(pp. 714~716)

By ZIRÔ NIKUNI.

(Agr. Chem. Laboratory, Tokyo Imp. Univ.; Received March 23, 1942.)

The lactone equivalents of α -sorinin and its derivatives are determined according to Fujita's method (J. of Pharm. Soc. Japan. **55**, 291, 1935).

This method is carried out as follows: An excess amount of caustic alkaline solution is added to the sample and heated on the water-bath, and then back titrated with sulphuric acid solution. Thus the saponification equivalent is determined. Then the excess amount of sulphuric acid is added and the whole mixture is heated to close the lactone ring, and the sulphuric acid is back titrated with alkaline. The lactone equivalent is derived from the following equation:—

$$\text{The lactone equivalent} = \frac{10,000 \times P}{n},$$

where P is grams of the sample and n is volume (cc) of 0.1 N sulphuric acid solution.

The results are summarized in the following table.

| Sample (g.) | 0.1 N NaOH (cc) | 0.1 N H_2SO_4 (cc) | Saponification equivalent | Lactone equivalent |
|-------------------------------------|-------------------|------------------------|---------------------------|--------------------|
| (1) Dimethyl- α -sorigenin | | | | |
| (a) 0.0186 | 0.65 | 0.65 | 286 | 286 |
| (b) 0.0467 | 1.67 | 1.90 | 279 | 245 |
| as $C_{15}H_{14}O_5$ | | | 274 | 274 |
| (2) α -Sorigenin | | | | |
| (a) 0.0356 | 1.39 | 0.15 | 256 | 2373 |
| (b) 0.0254 | 1.05 | 0.11 | 241 | 2309 |
| as $C_{13}H_{10}O_5$ | | | 246 | 246 |
| (3) α -Sorinin | | | | |
| (a) 0.0272 | 0.36 | 0.41 | 755 | 663 |
| (b) 0.1090 | 1.71 | 1.46 | 626 | 733 |
| as $C_{24}H_{28}O_{14}$ | | | 530 | 530 |
| (4) Diacetyl- α -sorigenin | | | | |
| 0.0201 | 1.85 | 0.18 | 108 | 1116 |
| as $C_{18}H_{18}O_5(CH_3CO)_2$ | | | 110 | 330 |
| (5) Monomethyl- α -sorigenin | | | | |
| (a) 0.0377 | 1.39 | 0.56 | 271 | 673 |
| (b) 0.0320 | 1.00 | 0.38 | 320 | 842 |
| as $C_{14}H_{12}O_5$ | | | 260 | 260 |
| (6) Phthalid | | | | |
| 0.1006 | 7.56 | 7.00 | 136 | 143 |
| as $C_8H_6O_2$ | | | 134 | 134 |
| (7) Santonin | | | | |
| 0.0540 | 2.36 | 2.32 | 228 | 232 |
| as $C_{18}H_{18}O_5$ | | | 246 | 246 |

The character of the lactone ring depends upon the hydroxyl-groups of these compounds. For instance, the lactone ring of α -sorigenin, which has two free hydroxyl-groups, is opened very easily by dilute alkaline solution even at room temperature. And the ring closes again by addition of dilute acid solution. The ring opens too easily by alkaline solution so that the lactone equivalent becomes too large.

The lactone rings of α -sorinin and monomethyl- α -sorigenin, which have one hydroxyl-group, open and close more difficultly than that of α -sorigenin.

On the other hand the ring of dimethyl- α -sorigenin, which has no free hydroxyl-group, opens and closes only by alkaline and acid of moderate concentration, and at high temperature.

The author expresses his sincere thanks to Prof. B. SUZUKI for his kind guidance throughout this work.

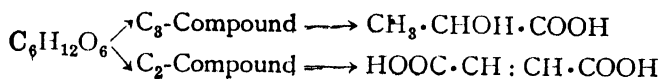
Studies on the Acid Fermentation by Rhizopus Species. (Part II.)

(pp. 717~718)

By Kinichirô SAKAGUCHI, Toshinobu ASAI,
and Hirohisa MUNEKATA.

(Agricultural Chemical Laboratory, Tokyo Imperial University; Received March 9, 1942.)

In the previous paper the authors assumed the following scheme for lactic or fumaric acid formation by *Rhizopus* species:

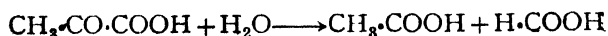


Pyruvic acid may be regarded as one of the most probable precursors to lactic acid as well as to fumaric acid, where the direct precursor to the former or the intermediate C_2 -compound as above mentioned, may be derived through the carboxylatic fission of pyruvic acid. This experiment has been carried out to investigate the metabolic products from Na-pyruvate by both the fumaric and lactic acids formers, *Rh. G 34* and *Rh. G 36*, with the following results:—

1) Lactic acid has not been found in the fermented liquids of both species. While remarkable quantities of fumaric acid have been formed in either case.

2) The production of ethyl alcohol only by the fumaric acid former, *Rh. G 34* was recognized.

3) Acetic and formic acids were formed abundantly by both species. The ratio acetic/formic was found to be approximately 2~2.5:1. The breakdown of the pyruvate may therefore be supposed to take place according to the following equation:—



Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Bestandteile der Fettsäuren des Zuckerrohrwachses (Zuckerrohrwachs. VIII. Mitteilung.⁽¹⁾)

(SS. 719~722)

VON T. MITUI und J. MATUDA.

(Aus dem Agrikulturchem. Laboratorium der Kaiserl. Universität Kyoto;
Eingegangen am 15. 4. 1942.)

Über die unverseifbaren Bestandteile des Zuckerrohrwachses hat T. Mitui in seiner I.~VII. Mitteilung berichtet.

Hier haben wir nun den verseifbaren Anteil dieses Wachses genauer untersucht. Unseren Beobachtungen nach ergeben sich als verseifbare Bestandteile der Fettsäuren die folgenden:

| | | | | | |
|--------------------|-----------------------|---|--------------------------------------|----------------------------|-----------------------|
| | | | | flüchtige Säure 1.3% | n-Caprinsäure |
| Fettsäuren 100% | nicht flucht. Säure { | { | NaHCO ₃ löslich 20% | Harzsäure | |
| | | | | | |
| | | { | flüssige Säure 28% | { | Linolensäure 0.3% |
| | | | | | α-Linolensäure 4% |
| | | | | | Ol-säure 14% |
| | | { | NaHCO ₃ schwer löslich | { | Caprinsäure |
| | | | | | Myristinsäure 0.8% |
| | | | | | Palmitinsäure 38% |
| | | | | | Stearinsäure 4% |
| | | | | | Behensäure 1.5% |
| | | | | u. a. | |

(1) VII. Mitteil.: J. Agr. Chem. Soc. Japan, 16 (1940) 917.

Synthesis of Vitamin B₁ by Microbes. 1.

(pp. 723~726)

By Kiyosi ASIDA.

(Agricultural Chemical Laboratory, Tokyo Imperial University; Received April 16, 1942.)

Untersuchungen über Vitamin in zuckerhaltigen Stoffen (III).Über den Vitamin B₆-Gehalt von der Spitze des
Zuckerrohrs und Schlempe.

(SS. 727~732)

Von Tyoten INAGAKI und Kiyoko NAGAO.

(Chemisches Lebensmittel-Forschungsinstitut der Meiji Zuckerindustrie;
Eingegangen am 11. 4. 1942.)**Studies on the Yeasts Found in "Miso."**

(pp. 733~741)

By Masatoshi MOGI.

(The Brewing Laboratory, Noda Syōyū Co., Ltd., Tiba-ken; Received April 14, 1942.)

**Studies on the Oxidation of Amino Acids
by Potassium Chlorate. (Part I).**On the Oxidation of Glutamic Acid and Amino Acid Solution
Decomposed from Protein Containing Materials.

(pp. 742~746)

By Tuneyosi KATUDA.

(The Institute of Research on Chemical Industry, Government-General of Taiwan;
Received March 9, 1942.)**Studies on Digestion of Imported Rice.**

(pp. 747~765)

By T. CHACHIN and M. KUBO.

(Municipal Hygienic Laboratory in Osaka; Received January 16, 1942.)

An experiment on the digestion of Japanese and imported rices was carried out and the result was as follows:

Digestion coeff. (%) of Japanese and imported rices.

| | Protein | Fat | Carbo- hydrate | Fibre | Ash | Calorie |
|--------------------|---------|-------|-------------------|-------|-------|---------|
| | % | % | % | % | % | % |
| Japanese rice | 80.05 | 83.06 | 99.48 | 66.06 | 81.96 | 95.20 |
| 70% imported mixed | 79.95 | 87.26 | 99.50 | 72.59 | 84.33 | 95.50 |
| Imported rice | 80.59 | 87.84 | 99.63 | 77.75 | 86.20 | 95.52 |

There is no difference in the digestion coefficient between Japanese and imported rices.

**Über die quantitative Bestimmung der Pyrethrine.
(XII. Mitteilung.⁽¹⁾)**

Eine neue Massanalyse der Pyrethrine durch Benzol-Extraktion.
(SS. 766~775)

Von Kiyoshi WAKAZONO, Keizo HIRAOKA, und Sankiti TAKEI.

(Aus d. Institut f. Chem. Forschung, Universität Kyoto;
Eingegangen am 28. März 1942.)

Zur quantitativen Bestimmung der Pyrethrine benutzt man als unentbehrliches Extraktionsmittel stets Petrolather (Kp. 40~60°).

Neuerdings haben wir gefunden, dass man durch einige Modifikationen des bisherigen massanalytischen Verfahrens zur Pyrethrin-Extraktion ruhig statt Petrolather Benzol als geeignetes Lösungsmittel benutzen kann und auch auf diese Weise durchaus befriedigende Resultate zu gewinnen vermag.

(1) XI. Mittel.: J. Agr. Chem. Soc. Japan, **18**, 229 (1942).

Functional Studies on Soils. (LIX).

(pp. 776~780)

By MISU-Hideo.

(Agricultural Experiment Station, Tyōsen; Received March 23, 1942)

**Dehalogenations of the Halogenated
Sugar Alcohols.**

(pp. 666~668)

(pp. 781~784)

By Yasuji HAMAMURA.

(Kyoto Sericultural College; Received March 2, 1942).

**(Part VI.) Dehalogenation of Dichlorodulcitol
by Zinc with Acetic Acid.**

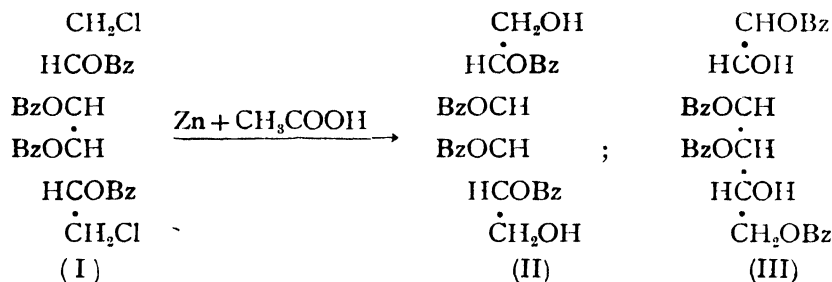
Now 1,6-dichlortetrabenzoyl dulcitol (I) was treated with zinc with acetic acid on the boiling water bath but the reaction proceeded very reluctantly. From

the incompletely dehalogenated mixture two crystals were isolated. One melted at 242°C, insoluble in acetone and the other at 137~142°C, soluble in acetone and hot alcohol.

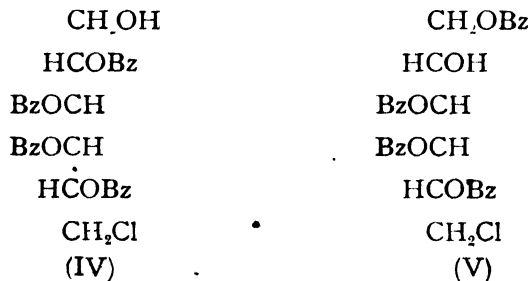
The former was free from chlorine and the latter had one mol chlorine. When the dehalogenating reaction was continued longer another crystal was obtained which melted at 208°C, and it was acetone-insoluble and free from halogen.

The crystal of m. p. 224°C (II) has no double bond but two free hydroxyl groups and gives hexabenzoyldulcitol (m. p. 192~3°) when benzoylate, and also gives dulcitol when hydrolysed by methyl alcoholic baryta.

The crystal m. p. 208°C (III) is the isomer of (II) and is smoothly obtained by heating the latter with pyridine by acyl migration. These facts show that the crystal m. p. 224°C (II) has been obtained by substitution of hydroxyl groups with chlorine atoms, so that this structure must be 2,3,4,5-tetrabenzoyldulcitol C% 68.05, H% 5.36, (calc. 68.08 H% 5.04) and that the other is 1,3,4,6-tetrabenzoyldulcitol C% 68.05, H% 5.38.,



The crystal m. p. 137~142°C seems to be the mixture of two substances. It may be the mixture of (IV) and (V) Cl% 5.40, C% 66.38, H% 4.79 (calc. Cl% 5.75, C% 66.17, H% 4.73)

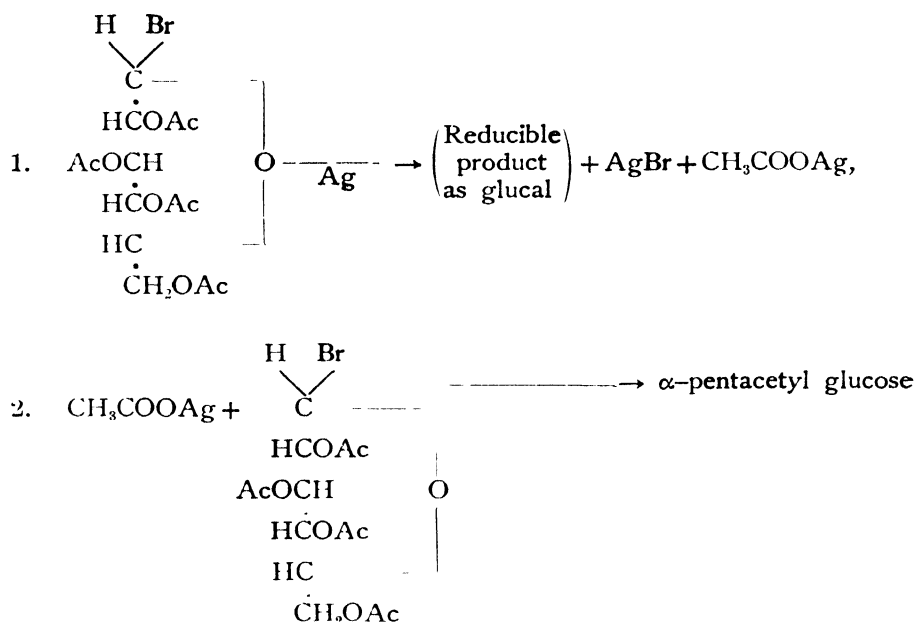


It gives monochlor-pentabenzoyldulcitol m. p. 126°C, C% 68.60, H% 4.85 (calc. C% 68.26 H% 4.61).

(Part VII.) Action of Molecular Silver on Acetobromoglucose.

The author obtained α -pentacetylglucose together with a reducible product from acetobromoglucose reacting with molecular silver.

It may perhaps be a product of the secondary reaction taking place between acetobromoglucose and silver salt of acetic acid which are produced in the first stage of the reaction.



(Part VIII.) The Types of the Dehalogenation of Halogenated Sugars.

The author classified the types of the dehalogenation of sugars into six classes as follows:

1. Glucal type: The model is E. Fischer's glucal⁽¹⁾ derived from acetobromoglucose.
2. Glucoseen type: The model is glucoseen⁽²⁾ derived from acetobromoglucose.
3. Anhydride type: The model is 3,6-anhydroglucose⁽³⁾ derived from triacetyl- β -methyl-glucoside-6-bromhydrin.
4. Substitution type: The model is 2,3,4,5-tetrabenzoyl dulcitol⁽⁴⁾ derived from 1,6-dichlor-tetrabenzoyl dulcitol.
5. Secondary derived type: The model is α -pentacetyl-glucose⁽⁵⁾ derived from acetobromoglucose.

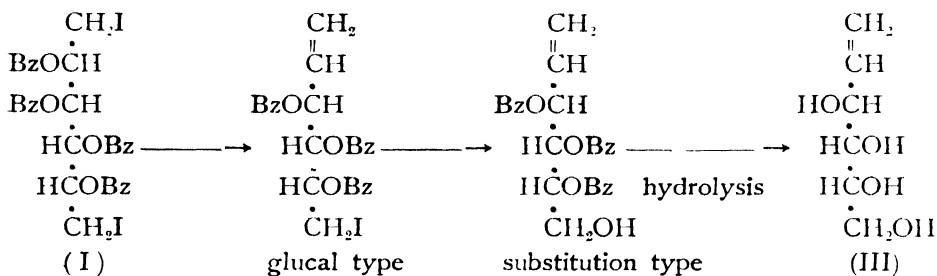
6. Normal type: The model is tetrahydroxy-manno-cyclitol⁽⁶⁾ derived from 1,6-diiodo-2:3, 4:5-dimethylene mannitol.

As above mentioned, the dehalogenations of halogenated sugar esters are very complex and more complex when two halogen atoms are substituted, because dehalogenations are caused in different types on each halogen atom, and, moreover, secondary reactions take place.

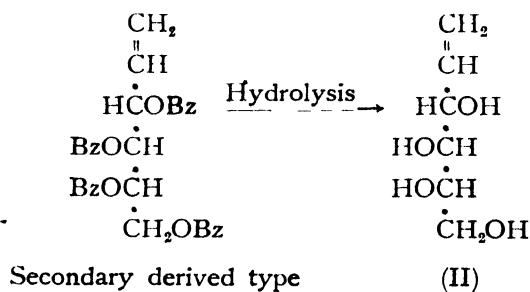
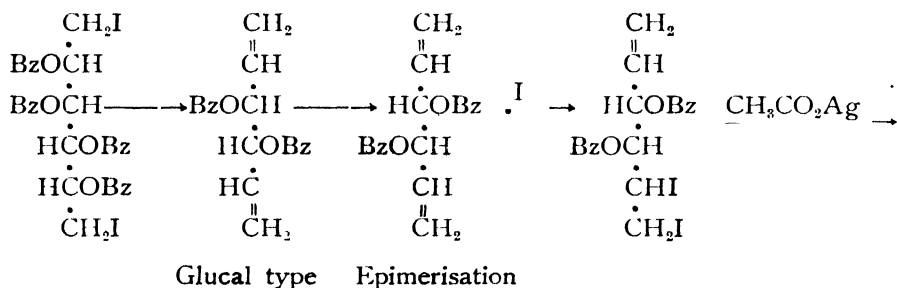
The author has always obtained *l*-3,4,5,6-tetrahydroxy-manno-hexene (1:2) (II) and its optical antipode (III) respectively, when dehalogenation of 1,6-diiodo-tetrabenzoyl-mannitol (I) was tried with molecular silver or with zinc and acetic acid.

The mechanism of the reaction is not yet perfectly understood but it may be as follows:

The case of zinc and acetic acid,



The case of molecular silver,



- (1) E. FISCHER: B., **47**, 200 (1915).
- (2) MAUCER: B., **62**, 332 (1929).
- (3) E. FISCHER: B., **45**, 456, 2068, 376L (1912).
- (4) Y. HAMAMURA: J. Agr. Chem. Soc. Japan,
- (5) Y. HAMAMURA: J. Agr. Chem. Soc. Japan,
- (6) F. MICHEL: A., **496**, 77 (1932).

On the Manufacture of Acetone and Butanol by Fermentation. (3).

(pp. 785~792)

By H. OKEDA, N. SOWA, A. WATABE, and Y. HASHIMOTO.

(Nippon Soda Co. Ltd.; Received March 23, 1942.)

Studies on the Acid Fermentation by Rhizopus Species. (Part III).

(pp. 793~798)

By Kinichirô SAKAGUCHI, Toshinobu ASAI,
and Hirohisa MUNEKATA.

(Agr. Chem. Laboratory, Tokyo Imperial University;

Received March 16, 1942.)

The authors have investigated the production of lactic and fumaric acids by two strains of *Rhizopus* species, Rh. G 34, the fumaric acid former, and Rh. G 36, the lactic acid former, in relation to the pH value of the medium. The summary of the results obtained is as follows:—

| | Rh. G 36 | | | | | Rh. G 34 | | | | | |
|----------------------------------|----------|-------|-------|-------|-------|----------|-------|-------|-------|-------|-------|
| The pH values of the medium | initial | 2.5 | 4.5 | 5.4 | 7.0 | 8.4 | 2.5 | 4.5 | 5.4 | 7.0 | 8.4 |
| | end | 2.5 | 2.7 | 3.0 | 3.8 | 4.2 | 2.5 | 2.5 | 2.7 | 4.0 | 4.1 |
| Volatile acid (cc. of N/10 NaOH) | | 3.7 | 4.5 | 7.2 | 24.0 | 32.5 | 4.2 | 4.2 | 3.4 | 4.4 | 17.0 |
| Fumaric acid (g) | | 0 | 0 | 0 | 0.015 | 0.248 | 0.098 | 1.323 | 1.888 | 2.792 | 1.359 |
| Lactic acid (g) | | 1.205 | 4.654 | 4.986 | 8.305 | 6.971 | 0.012 | 0.057 | 0.070 | 0.678 | 0.126 |
| Total non-volatile acid (g) | | 1.205 | 4.654 | 4.986 | 8.320 | 7.219 | 0.110 | 1.380 | 1.958 | 3.470 | 1.485 |
| Fumaric acid/Lactic acid | | 0 | 0 | 0 | 1/573 | 1/28 | 8/1 | 23/1 | 27/1 | 1/4 | 11/1 |

N. B.: The results correspond to 300 cc of the culture medium.

Appreciable quantities of fumaric acid have been formed by the lactic acid former at pH values higher than 7 along with lactic acid. The optimum pH zone of the medium for the production of fumaric and lactic acids by *Rhizopus* species seems to lie near pH=7. The accumulation of the volatile acids is favoured by a neutral or alkaline reaction of the medium.

Der bakterielle Abbau der Aminosäuren..

III. Mitteilung.

(SS. 799~808)

By Teijiro UYEMURA,

(Wissenschaftl. Laboratorium von Ch. Takeda Co. Ltd., Osaka :

Eingegangen am 5. 4. 1942.)

Grundlegende Untersuchungen über die Fixierung des Sericins. (6 Mitteilung)

(SS. 809~817)

Von Ziro HIROSE.

(Aus dem Institut für Seidenbau, der Aktiengesellschaft, Gunze-Sees.

zu Ayabe, Kyotofu: Eingegangen am 13. 4. 1942.)

Production of Mono-propen-1-ol-3-phosphoric Acid by Aspergillus Niger.

(pp. 818)

By Sinitiro BABA.

(Agricultural Chemical Laboratory, Tokyo Imperial University;

Received July 20, 1942.)

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ABSTRACTS

from

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Untersuchungen über die Beziehungen von Bataten zur Alkoholprodukten. (VI.)

(SS. 819~826)

Von K. SUEMATU, M. UTIKOSI und T. MATUMURA.

(The Institute of Chemical Industry, Government-General of Taiwan, Nippon ;

Received April 13, 1942.)

On the Manufacture of Acetone and Butanol by Fermentation. (4).

(pp. 827~834)

By H. OKEDA, N. SOWA, A. WATABE, and Y. HASHIMOTO.

(Nippon Soda Co. Ltd ; Received March 16, 1942)

Comparative Study on Chemical Compositions of Different Parts of Soy Beans.

(pp. 835~842)

By Kenzo NAKAJIMA and Sei-iti SAKURADA.

(Sugiyama's Research Institute for Industrial Chemistry ;

Received April 24, 1942.)

Chemical compositions, distributions of proteins of different solubility and properties of oil of soy beans (mixed varieties) produced in Chien-tao, Eastern Manchuria, were compared with one another in respect to different parts of beans. Of three different parts of cotyledon, center, middle and surface zones, the first was richest in oil and poorest in protein and the third was poorest in oil and richest in protein. The hilum side or embryo side was richer in protein and

poorer in oil, and the percent of water soluble protein was higher and that of insoluble protein was lower than in the corresponding opposite side. The iodine value of oil extracted from embryo was 150. The iodine value of oil extracted from the center part of cotyledon was higher than that obtained from surface part. The center part of cotyledon was much more easily pulverised than the surface part. From the difference of this physical property and the results of comparative analyses, the supposition that the length of cells or protein molecules in the center part of cotyledon is shorter than that in the surface part is deduced according to Staudinger's theory.

Studies on the Industrial Hydrolysis of Whale Meal.

(pp. 843~851)

By Osamu KITAYAMA.

(Chemical Laboratory, Kwansai Daini Amino Acids Production, Co., Ltd., Sakosi, Hyogo-ken;
Received May 15, 1942.)

Studies on the industrial hydrolysis with HCl for whale meal were made, and results were as follows:—

1. The necessary HCl concentration is over 15% solution for the successful hydrolysis.
2. The time required varies according to the temperatures, 6 h. at 120°, and 3 h. at 130°C. The thermal coefficient may be about 2.
3. Hydrolyzing affects are related to the absolute quantities of HCl against proteins; about 35% for the perfect industrial hydrolysis.
4. If hydrolyzing temperature comes up to 150°, amino nitrogen is decreased and a bitter taste is obtained.

Colloid-Chemical Studies on the Soluble Alginate (II.)

Soluble Alginate as a Protecting Colloid.

(pp. 852~854)

By Noboru SUZUKI.

(The Hakodate College of Fisheries; Received May 18, 1942.)

The protecting power of soluble alginate against the formation of copper-sol, and its gold number were studied, being compared with those of agar-agar and tragacanth-gum.

The results were summarized as follows.

1. The protecting power of sodium alginate was independent of the amount of added hydrazine hydrate. When a sufficient amount of hydrazine hydrate was

used the protecting power of the colloid could be represented by the minimum amount of the protecting colloid forming the copper-sol.

II. The protecting power of sodium alginate against the formation of copper-sol was superior to those of agar-agar and tragacanth-gum, while the protecting power against gold-sol given in gold number of alginate was inferior to those of others.

Studies on Digestion of Imported Rice. (II).

(pp. 855~865)

By T. CHACHIN and M. KUBO.

(Municipal Hygienic Laboratory in Osaka; Received January 16, 1942.)

On the Composition of Forest Humus Layer (H Layer.)

(pp. 866~868)

By R. KAWASHIMA, M. NAGATA and G. SUYAMA.

(Ag Chem Laboratory, Kyushu Imp University, Received June 1, 1942.)

Functional Studies on Soils. (LX).

(pp. 869~872)

By MISU-Hideo.

(Agricultural Experiment Station, Tyōsen; Received March 23, 1942)

The Influence of Copper Sulphate Solution upon the Basal Metabolism of White Rat

(pp. 873~874)

By Tetutarō TADOKORO and Jizō HASHIMOTO.

(Hokkaido Imperial University; Received April 17, 1942.)

Separation and Identification of Fatty Acids. Part 8.

Preparation of Ricinoleo- and Ricinoelaido-hydroxamic Acid and Pure Ricinoleic Acid.

(pp. 875~878)

By H. YUKAWA and Y. INOUE.

(Biochem. Lab., Dept. of Agriculture, Kyoto Imperial University,

Received June 8, 1942)

It has hitherto been known that the best preparation method of pure ricinoleic acid is the Ba-salt-ethanol method. The authors, however, prepared a pure sample by simpler procedures directly from castor oil through the hydroxamic acid derivative, of which the method of preparation has been already reported in these serial papers.

Ricinoleohydroxamic acid is a cluster of small white needles, m. p. 65.5°C, and 28 g. of the acid was obtained from 46.5 g. of castor oil. Ricinoelaidohydroxamic acid was also prepared from ricinoelaidic acid which was derived from ricinoleic acid by the action of nitric acid, m. p. 88.5~89.0°C, needles. And the hydroxamic acids were treated with ethanol-sulphuric acid in the current of carbon dioxide as the authors' usual method and pure free acids were recovered. Ricinoleic acid ethylester, iodine value 77.4, saponification value 171.0, acetyl value 152.4; Ricinoelaidic acid, m. p. 52.5~53°, neutralization value 187.2, iodine value 84.6.

Microbiological Studies on Meat and Meat Products. Part I.

Classification of the Proteolytic Bacteria Isolated from Sausages.

(pp. 879~884)

By Yuji SASAKI and Masayuki NAKANE.

(Applied Mycological Laboratory, Hokkaido Imperial University,

Received May 19, 1942)

The authors isolated twelve strains of bacteria from putrefid sausages, and classified them into four species *Micrococcus caseolyticus*, *Micrococcus botulinus* n. sp., *Flavobacterium esteroaromaticum* and *Bacillus cereus*. They decompose the proteins of meat, producing hydrogen sulfide.

One of the four, *M. botulinus*, is a new species: spherical, 0.9~1.5 μ in diameter, Gram-positive, nitrites produced from nitrates, gelatin liquefied, and milk acid but not coagulated and not peptonized.

F. esteroaromaticum is a fruity aroma producer.

The optimum temperature for their growth is about 31°C. *M. caseolyticus*, *M. botulinus* and *F. esteroaromaticum* can grow at 3~5°C., but cannot at 50°C. *B. cereus* cannot grow at both temperatures.

The optimum ranges of hydrogen ion concentrations for their growth are between pH 6.6 and 7.6, and the limits are pH 5.8 and 9.0.

M. caseolyticus, *M. botulinus* n. sp. and *F. esteroaromaticum* are killed by heating for 5 min. at 60°C., while *B. cereus* survives 100°C. for 30 min.

The growth of *M. caseolyticus* and *F. esteroaromaticum* are inhibited by addition of 10% sodium chloride to the nutrient agar. 15% of salt prevents the growth of *B. cereus*. *M. botulinus* n. sp. is a halotolerant bacterium, growing readily on the nutrient agar containing 25% of sodium chloride.

On Soil-microorganisms in China. (1).

Occurrence of Azotobacter in North China and Inner Mongolia.

(pp. 885~888)

By Kinsi SUMINOE.

(Tokyo Agricultural University; Received July 16, 1942.)

Among 80 samples of soil in North China and Inner Mongolia studied, Azotobacters were found in 79. *Az. chroococcum* is widely distributed. In some samples *Az. vinerandii* was found. Two new types of Azotobacter were also found. One type produces brown colour like *Az. chroococcum*, but the colouring-matter is water-soluble, on which point it being different from *Az. chroococcum*. The other type does not grow on Aschby's mannit media, but grows when glucose is used instead of mannit. These are special natures of this type distinguishing from Azotobacters hitherto known.

Chemical Researches on the Utilisation of the Tropical Forest Products. Part I.

Studies of Pulping of Wattle Wood.

(pp. 889~896)

By M. SHIKATA, I. TACHI, Y. KIMURA, and Y. OKADA.

(Dept. of Agriculture and Chemical Institute, Kyoto Imperial University;

Received May 21, 1942.)

Chemische Bestimmung von Vitamin B₂ in Hefe.

(SS. 897~902)

Von Makoto ODA.

(Laboratorium von Meiji-Seito & Co. Ltd., Tokio, Eingegangen am 29. Mai, 1942.)

On the Amylase of *Rhizopus* Species.

(pp. 903~911)

By Toshinobu Asai and Shin-ichiro MATSUMOTO.

(Agricultural Chemical Laboratory, Tokyo Imperial University,
Received April 11, 1942)

The relative activities of the amylase of thirty-nine species of *Rhizopus* were investigated. *Rh. javanicus* Takeda and *Rh. semarangensis* Takeda, the former belonging to a dry, air-mycelium developing group, the latter belonging to a wet, scarcely air-mycelium developing type, were selected as having the strongest amylolytic power. The opt. pH and the opt. temperature of the amylase of *Rhizopus* mentioned above were as follows:

| | Rh. javanicus Takeda | | Rh. semarangensis Takeda | |
|---------------------|----------------------|--------------|--------------------------|--------------|
| Liquefying power | pH=5.0, 60°C | pH=5.9, 50°C | pH=4.5, 60°C | pH=6.3, 55°C |
| Dextrinising power | pH=4.5, 50°C | | pH=4.5, 50°C | |
| Saccharifying power | pH=4.4, 55°C | pH=5.5, 55°C | pH=4.2, 55°C | pH=5.5, 55°C |

From the appearance of the two different optimum zones in both liquefying and saccharifying powers, the existence of α - and β -amylase was suggested as already proved by Tokuoka for *Aspergillus Oryzae*.

Lastly the authors investigated the influence of shaking culture on the activity of mould amylase and it was found that *Rh. javanicus* Takeda was strongly activated in its amylolytic power by that process.

Chemical Researches on the Dyeing of "Oshima-Tsumugi." Part II.

On the Dyeing Tannins from *Rhaphiolepis Umbellata*.

(pp. 912~914)

By Kotaro NISHIDA.

(Laboratory of Agricultural Chemistry, Kagoshima Agricultural College;
Received April 27, 1942)

On a New Polypeptide Isolated from *Eisenia Bicyclis*. (Part IV.)

A Study of the Chemical Structure of Eisenin. (3)

(pp. 915~919)

By Toshihiko OOHARA.

(Ueda Imperial College of Sericulture and Silk-Industry; Received June 1, 1942.)

It has been communicated, in the previous paper, that *l*-pyroglutamyl-*d*-

glutamyl-*d*-alanine may be given as the chemical structure of eisenin, especially from the confirmed fact that eisenin molecule consists of *l*-pyroglutamyl-*d*-glutamic acid monoamide and *d*-alanine.

Additional data that the actual structure of eisenin can be definitely stated, have now been obtained and in the present paper further work will be reported.

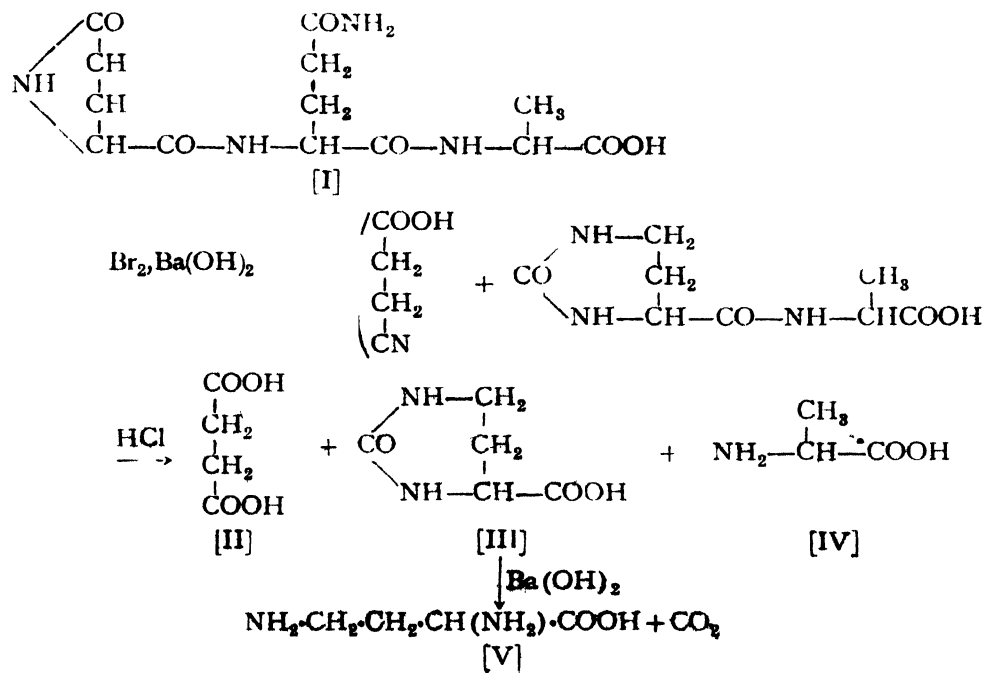
Eisenin was treated with brom and barium hydroxide solution according to Hofmann's decomposition which was adopted by P. Karrer and his collaborators for the preparation of *l*- α,γ -diaminobutyric acid from acetyl-*d*-glutamine.

After a complete hydrolysis of the reaction product, glutamic acid, alanine [IV], succinic acid [II] and a new beautifully crystallized substance were obtained. However, *d*- α,γ -diaminobutyric acid, which was expected to be produced also from eisenin, was not obtained.

The new crystal has the composition $C_6H_8O_3N_2$, melts at $201\sim 2^\circ$ followed by decomposition with effervescence and is soluble in water and alcohol, but insoluble in ether. The crystal contains one free carboxyl group which is determined by titration with 0.1 *N* barium hydroxide solution. On hydrolysis with concentrated barium hydroxide solution, it yields a syrupy basic substance which gives ninhydrin reaction contrary to the original substance.

The monooxalate and dibenzoate were obtained in colourless crystals from the syrupy substance mentioned above. It was found that these derivatives were completely identical with the same derivatives prepared from *dl*- α,γ -diaminobutylic acid [V] synthesised by Fischer's methods.

The author suggests, therefore, that hexahydropyrimidine -2-on-6-carboxylic



acid [III] may be given as the chemical structure of the new crystal yielded by of H of mann's decomposition of eisenin.

All these reactions in this experiment may be shortly expressed by the following scheme (p. 75):

From these results it is concluded that eisenin may be a polypeptide which is surely denoted by *l*-pyroglutamyl-*d*-glutaminyl-*dl*-alanine [I] as its actual chemical structure.

Studies on the Synthetic Nitrogenous Fibres. (Part 2.)

(pp. 920~922)

By Shūiku SASAKI and Masato MIYAUTI.

(Sericultural Chemical Institute, Department of Agriculture, Kyūshū Imperial University;

Received June 4, 1942.)

β -Amino-ethylalcohol was mixed with one of various dicarboxylic acids, e. g., oxalic, succinic, adipic, azelaic, or sebacic acids in equimolecular proportion, and polymerized at high temperature and low pressure. Among the polymers synthesized as above mentioned, polyamide-ethylsebacate, of which the structural unit is considered to be $[-OOC(CH_2)_8CONH(CH_2)_2-]$, has a property capable of forming an useful fibre.

This paper deals with the method of the polymerization and some properties of the polyamide-ethylsebacate.

Der Bakterielle Abbau der Aminosäuren.

IV. Mitteilung.

(SS. 923~931)

By Teijiro UYEMURA.

(Wissenschaftl. Laboratorium von Ch. Takeda Co. Ltd., Osaka:

Eingegangen am 20. Juli 1942.)

On the Manufacture of Artificial Fibres from Proteins. (Part III).

On the Problem of Increasing the Wet-strength of the Fibre.

(pp. 932~934)

By Masami OKU and Yutaka HOSOKAWA.

(From the Chemical Fibre Laboratory, Ueda Imperial College of Sericulture and Silk Industry; Received June 12, 1942.)

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ABSTRACTS

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Study of the Insecticidal Principle in the Smoke Produced by Combusting Insect Powder. (Part IX.)

(pp. 935~939)

By Makoto NAGASE.

(The Institute of Physical and Chemical Research;

Received May 25, 1942.)

Studies on the Yeasts Found in "Miso."

(pp. 940~944)

By Masatoshi MOGI.

(The Brewing Laboratory, Noda Syōyu Co. Ltd., Tiba-ken;

Received June 11, 1942.)

On the Manufacture of Acetone and Butanol by Fermentation. (5).

(pp. 945~954)

By H. OKEDA, N. SOWA, A. WATANABE,
and Y. HASHIMOTO.

(Nippon Soda Co. Ltd.; Received February 23, 1942.)

Studies on Acetone-Butylalcohol Fermentation. IV.
Accessory Factors for Growth and Fermentation. (1).

(pp. 955~960)

By **Sigeyosi HORIE.**

(Agricultural Chemical Laboratory, Kyūsyū Imperial University,
 Fukuoka, Nippon; Received June 17, 1942.)

Untersuchungen über die Saccharase von Zuckerrohr.
I. Mitteilung.

Über die Saccharase in den Blättern des Zuckerrohrs.

(SS. 961~964)

Von **Minoru FUJII.**

(Aus dem Institut für Zuckerforschung in Tainan:
 Eingegangen am 25. Mai 1942.)

Grundlegende Untersuchungen über die Fixierung
des Sericins. (7 Mitteilung)

(SS. 965~971)

Von **Ziro HIROSE.**

(Aus dem Institut für Seidenbau, der Aktiengesellschaft, Gunze-Seisi,
 zu Ayabe, Kyotofu: Eingegangen am 13. 4. 1942.)

The Influence of Steam-heating Process upon
the Water Soluble Protein in Soya Bean in
the Round Cake Pressing Method.

(pp. 972~974)

By **Rishichi TANAKA.**

(The Central Laboratory, South Manchuria Railway Co., Dairen;
 Received June 15, 1942.)

Über die Synthese von α -Naphthylelessigsäure.

(pp. 975~980)

Von **Teijiro YABUTA, Kinjiro TAMARI, Sinji MITSUNAGA**
und Toschihide KUNIMUNE.

(Landwirtschaftliches Chemisches Laboratorium der Kaiserl. Universität zu Tokyo:
 Eingegangen am 15. 6. 1942.)

On Inulinase, Amylase, and Urease in Yeast.

(pp. 981~986)

By Motoyoshi HONGO.

(Agr. Chem. Laboratory, Faculty of Agr., Tokyo Imperial University;

Received June 17, 1942.)

Butyric Acid Fermentation. (II).

(pp. 987~994)

By Toshinobu ASAI and Eitaro KOMATSU

(Agricultural Chemical Laboratory, Tokyo Imperial University; Received June 19, 1942.)

Chemical Studies on the Tyōsen Cattle. (Part 1).

On Physical and Chemical Properties of the
Body Fat of Fattened Tyōsen Cows.

(pp. 995~1007)

By Norihide ANDO.

(College of Agriculture and Forestry, Suigen, Tyōsen; Received June 1, 1942.)

In the present fattening experiment twenty-four cows of Tyosen native breed of about six years of age were divided into two dietary groups of barley and sweet potato, each group consisting of four lots receiving different amounts of soybean oil cake: Lot I receiving no soybean oil cake, Lot II receiving four per cent, Lot III nine per cent, and Lot IV twenty per cent of soy bean oil cake.

At the end of the fattening experiment fifteen of all the fattened cows were selected and slaughtered to take their body fat samples, of which physical and chemical properties were studied.

The experimental results are as follows:

Table I. Buttocks Hypodermic Fat

| Group | Lot | Melting Point | Acid Value | Saponification Value | Iodine Value |
|--------------------|------|---------------|------------|----------------------|--------------|
| Barley Group | I | 43.0°C | 10.17 | 198.3 | 45.36 |
| | II | 38.5 | 9.92 | 198.0 | 51.52 |
| | III | 40.8 | 9.95 | 197.5 | 48.56 |
| | IV | 42.5 | 11.00 | 197.8 | 45.16 |
| | Mean | 41.1 | 10.00 | 197.8 | 47.83 |
| Sweet Potato Group | I | 39.5 | 14.03 | 196.4 | 51.60 |
| | II | 40.5 | 9.91 | 199.5 | 46.84 |
| | III | 41.3 | 9.38 | 199.6 | 49.05 |
| | IV | 39.3 | 10.21 | 201.4 | 50.79 |
| | Mean | 40.1 | 10.72 | 199.5 | 50.32 |

Table II. Kidney Fat

| Group | Lot | Melting Point | Acid Value | Saponification Value | Iodine Value |
|--------------|------|---------------|------------|----------------------|--------------|
| Barley Group | I | 51.0°C | 14.36 | 199.8 | 30.01 |
| | II | 49.5 | 18.60 | 200.1 | 34.04 |
| | III | 50.5 | 15.78 | 200.0 | 30.66 |
| | IV | 49.5 | 11.31 | 199.8 | 32.12 |
| | Mean | 50.2 | 15.17 | 199.9 | 31.50 |

| Group | Lot | Melting Point | Acid Value | Saponification Value | Iodine Value |
|--------------------|------|---------------|------------|----------------------|--------------|
| Sweet Potato Group | I | 50.0°C | 12.37 | 197.6 | 34.70 |
| | II | 50.2 | 20.47 | 195.8 | 32.30 |
| | III | 48.8 | 16.71 | 197.8 | 34.18 |
| | IV | 49.8 | 16.58 | 200.9 | 33.36 |
| | Mean | 49.8 | 16.92 | 198.1 | 33.47 |

The results indicate that the different fodders and the amount of soybean oil cake added have no distinct effects on physical and chemical properties of buttocks hypodermic and kidney fats, and the author's results are nearly the same as those of previous workers.

Furthermore, some biometrical constants of all the samples were studied by the author and tabulated as follows:

Table III. Mean Value, Standard Deviation, Coefficient of Variability.

| | Mean Value | | Standard Deviation | | Coefficient of Variability | |
|----------------------|----------------|---------------|--------------------|---------------|----------------------------|--------------|
| | Hypodermic Fat | Kidney Fat | Hypodermic Fat | Kidney Fat | Hypodermic Fat | Kidney Fat |
| Melting Point | 40.70 ± 0.27 | 50.17 ± 0.19 | 1.558 ± 0.192 | 1.075 ± 0.132 | 3.83 ± 0.47 | 2.14 ± 0.26 |
| Acid Value | 10.57 ± 0.32 | 16.34 ± 0.64 | 1.844 ± 0.227 | 3.698 ± 0.455 | 17.45 ± 2.49 | 22.63 ± 3.34 |
| Saponification Value | 198.74 ± 0.46 | 198.54 ± 0.37 | 2.626 ± 0.323 | 2.136 ± 0.263 | 1.32 ± 0.16 | 1.08 ± 0.13 |
| Iodine Value | 49.63 ± 0.39 | 32.80 ± 0.40 | 2.214 ± 0.272 | 2.315 ± 0.285 | 4.46 ± 0.52 | 7.06 ± 0.87 |

According to the results of statistical researches^(a) there are a slight positive correlation between H_M and K_M , a middling positive correlation between H_I and K_I , a heavy negative correlation between H_M and H_I , and also a heavy negative correlation between K_M and K_I . But in all other cases no correlation has been observed. The four cases are tabulated as follows:

- (a) H_M : Melting Point of Hypodermic Fat
 H_I : Iodine Value of Hypodermic Fat
 K_M : Melting Point of Kidney Fat
 K_I : Iodine Value of Kidney Fat

Table IV. Correlation Coefficient and Regression Coefficient.

| Between | Correlation Coefficient (<i>r</i>) | Regression Coefficient (<i>R</i>) | |
|-----------------|---|--|---------------------|
| | | $\frac{R H_M}{K_M}$ | $\frac{R M}{H_M}$ |
| H_M and K_M | $+0.48 \pm 0.13$ | $+0.070 \pm 0.22$ | $+0.33 \pm 0.11$ |
| H_I and K_I | $+0.68 \pm 0.09$ | $\frac{R H_I}{K_I}$ | $\frac{R K_I}{H_I}$ |
| | | $+0.65 \pm 0.12$ | $+0.71 \pm 0.13$ |
| H_M and H_I | -0.82 ± 0.06 | $\frac{R H_M}{H_I}$ | $\frac{R H_I}{H_M}$ |
| | | -0.57 ± 0.07 | -1.16 ± 0.14 |
| K_M and K_I | -0.80 ± 0.06 | $\frac{R K_M}{K_I}$ | $\frac{R K_I}{K_M}$ |
| | | -0.37 ± 0.05 | -1.72 ± 0.22 |

Untersuchung über die Synthesen der Phosphatiden und ihrer verwandten Verbindungen.

Mitteilung III.

Darstellung des Trimethylaminhydrochlorides.

(SS. 1008~1009)

Von Yataro OBATA.

(Aus dem Agrikulturchem. Laboratorium, Kaiserl. Universität, Tokio;
Eingegangen am 20. 6. 1942.)

Untersuchungen über die Synthesen der Phosphatiden und ihre verwandten Verbindungen. Mitt. IV.

Synthese von β -Bromcholinsalz.

(SS. 1010~1012)

Von Yataro OBATA.

(Aus dem Agrikulturchem. Laboratorium, Kaiserl. Universität, Tokio;
Eingegangen am 20. 6. 1942.)

On the Estimation of Vitamin B₂

(pp. 1013~1021)

By T. KOYANAGI, O. HUIJI, and Bukiti KIKUTI.

(Agricultural Chemical Laboratory, Tokyo Imperial University;

Received June 30, 1942.)

Studies on the Manufacture of Organic Acids.

(Parts 1~2)

(pp. 1022~1028)

By Y. INOUE, M. HAMADA, H. KAMEDA, and E. INOUE.

(Biochemical Laboratory, Department of Agriculture, Kyoto Imperial University,
and Sankyo Company, Osaka Factory; Received April 5, 1942.)

Part 1. Formation of Malic Acid from Maleic Acid.

For the purposes of the confirmation of the reaction mechanism and the increasing of the yield in the formation of malic acid from maleic acid, the authors repeated several experiments, by which it was shown that, as Weiss and Down reported, at the lower temperature an equilibrium exists among maleic, fumaric, and malic acids, while at the higher temperature the equilibrium is between fumaric and malic acids in spite of starting with maleic acid.

And at the same time many compounds were tested as catalysts for the formation of malic acid and it was found that when aluminium oxide was used as catalyst, the condition of reaction being temp. 160°C, pressure 85 lbs per sq. inches, reaction time 8 hrs. and 50 cc of water to 10 g of maleic acid, the yield of malic acid was 80.8% which was the best.

Part 2. Transformation of Maleic Acid to Fumaric Acid.

Many catalysts were investigated under the condition of atmospheric pressure for the transformation of aqueous maleic acid solution to fumaric acid, and it was concluded that potassium rhodanate was the best catalyst.

For instance, the yield attained to 93% when 60 g of maleic acid and 2 g of potassium rhodanate were dissolved in 100 cc of water and boiled for about 2.5 hours.

Studies on the Manufacture of Organic Acids. Part 3.

Fumaric Acid from Furfural.

(pp. 1029~1032)

By Y. INOUE, M. HAMADA, and S. ITO.

(Biochemical Laboratory, Department of Agriculture, Kyoto Imperial University,
and Sankyo Co., Osaka Factory; Received May 25, 1942.)

In the authors' laboratory, Dr. Takahashi already obtained a patent (Japanese Pat. 137755) for manufacturing fumaric acid, using furfural as raw material and aqueous sodium chlorate solution as oxidizing agent in the presence of manganese dioxide and a minor quantity of vanadium pentoxide. This process may be more efficient than any other method. It is, however, of some danger to have a great deal of crystalline NaClO_3 in stock in the factory for industrial purpose, because of its liability to spontaneous explosion, and at the same time the concentration of chlorate solution to be employed in this process is not so low. Therefore, in the present work, the authors attempted to modify the above method by means of continuous preparing of diluted NaClO_3 solution by electrolysis of NaCl solution, using graphite and iron plates as electrodes, into which, when the concentration of NaClO_3 produced amounted to about 9%, furfural was added in drops and well stirred in the presence of the catalysts, being acidified with HCl and warmed up to 90°C . It may be considered that electrolytic oxidation would also take place in this condition. The total consumption of furfural was identified by aniline acetate test. As fumaric acid is sparingly soluble in cold water, the crops were gathered by cooling, after separating off the catalysts through filter, and then the mother liquor was refined with alkali, by which the dissolved manganese compounds were taken off, and could be used repeatedly as electrolyte. The yield of fumaric acid in repeated utilization of electrolyte may, under the conditions described below, be seen in the following table.

| Steps. | Yield to furfural added, % | Steps. | Yield to furfural added, % |
|---------|-------------------------------|---------|-------------------------------|
| 1 | 51 | 6 | 52 |
| 2 | 30 | 7 | 77 |
| 3 | 32 | 8 | 66 |
| 4 | 35 | 9 | 68 |
| 5 | 54 | | |

Experiments were always carried out in 1 litre porcelain cylinder, starting with 500 g. of electrolyte, and employing graphite anode of 140 square cm. and iron cathode of 78 square cm. Factors which affect the electrolysis and the subsequent oxidation process for the present research were severally investigated one by one and it was shown, in conclusion, that the best case was as follows; starting with 500 g. of 30% NaCl solution with 3 cc of 30% HCl and 1 g of $\text{K}_2\text{Cr}_2\text{O}_7$ which would prevent the reduction of ClO' , current density being 15 amp. per square dm., and voltage being 4~5 volt at temperature of $70\text{--}80^\circ\text{C}$. It may contain about 9% NaClO_3 in the electrolyte after 12 hours, when 10 g of MnO_2

and 0.05 g V_2O_5 are well mixed with the solution and from separating funnels, each 30 cc of furfural and 30% HCl being added in drops at the rate of 0.5 g per min., temperature being raised to 90°C under the constant electric current. Subsequent procedure is as described and the yield of fumaric acid may attain 70-80%.

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

On the Acid Fermentation by *Aspergillus niger*. A Supplement to Part I.

(pp. 1033~1034)

By Kinichiro SAKAGUCHI and Sinitiro BABA.

(Tokyo Imperial University, Received June 26, 1942)

In the previous paper⁽¹⁾ the authors have reported that their organisms (*Asp. niger* var. No. 2 and *Asp. niger* var. No. 25) were capable of forming citric acid from glycerol and ethanol, but not from pyruvic, formic acids or methanol. In the present work they investigated whether the presence of those substances exert

Table I. (C_2 , C_3 , C_4 & C_6) $P_H=6.4$, Cultural temp. 32~33°.

| | Control | Na-Acetate | Ethanol | Na-Succinate | Na-Malate | Na-Pyruvate | Ca-Gluconate |
|--------------------|---------|------------|---------|--------------|-----------|-------------|--------------|
| Sugar present | 3.64 g | 3.64 | 3.64 | 3.64 | 3.64 | 3.64 | 3.64 |
| Sugar remained | 0.93 | 0.63 | 0.98 | 0.83 | 0.78 | 0.98 | 0.78 |
| Sugar consumed | 2.71 | 3.01 | 2.66 | 2.81 | 2.86 | 2.66 | 2.86 |
| Citric acid formed | 0.726 | 0.898 | 0.929 | 0.838 | 0.898 | 0.929 | 0.757 |
| Film weight | 2.957 | 2.519 | 2.782 | 3.213 | 3.116 | 2.920 | 3.163 |
| Cultural age | 24 hrs | 65 | 24 | 24 | 24 | 24 | 24 |
| Yield | 100 | 123 | 127 | 115 | 123 | 127 | 104 |

(1) The substrates were added at the rate of 0.5% as free acids except ethanol.

(2) The mean value of parallel cultures are shown in the above table.

Table II. (C_1) $P_H=6.4$, Cultural temp. 32~33°

| | Control | Na-Formate | Methanol |
|--------------------|---------|------------|----------|
| Sugar present | 2.18 gr | 2.18 | 2.18 |
| Sugar remained | 0.60 | 0.83 | 0.60 |
| Sugar consumed | 1.58 | 1.35 | 1.58 |
| Citric acid formed | 0.233 | 0.290 | 0.496 |
| Film weight | 2.897 | 2.520 | 2.956 |
| Cultural age | 24 hrs | 24 | 24 |
| Yield | 100 | 119 | 212 |

(1) The substrates were added at the rate of 1%.

(2) The above figures are the mean values of parallel cultures.

any effect upon the yield of citric acid from glucose. The results obtained are as follows.

Literature

- (1) This Journal, 18, 405 (1942).

Studies on the Determination of Vitamin B₂ (Lactoflavin) in Various Food Materials.

(pp. 1035~1040)

By Ryusaku HOSINO, Mituo FUJITA, and
Hisasi ARIYAMA.

(The Laboratory of Food Supplies, the Yokosuka Naval Bureau of Munitions;
Received July 8, 1942.)

To estimate the lactoflavin in food materials, we modified Lunde's method in respect to the blank test, and measured the flavin content of 40 kinds of various foods and three kinds of cooked diet.

Über die Synthese von Chinolinsäuremethylbetainäthylester, das Isomer des „Fermentation-Auxin“ (sogenannt von Herrn Ootsu), und Prüfung auf ihr gährungsförderndes Vermögen.

(SS. 1041~1043)

Von Teijiro YABUTA und Kinjiro TAMARI.

(Landwirtschaftliches Chemisches Laboratorium der Kaiserlichen Universität
zu Tokio: Eingegangen am 15. 6. 1942.)

Über die Verhinderung der Keimung der Kartoffel durch die Wirkung einer auxinähnlichen Substanz.

(pp. 1044~1046)

Von Teijiro YABUTA und Kinjiro TAMARI.

(Landwirtschaftliches Chemisches Laboratorium der Kaiserlichen Universität zu
Tokio: Eingegangen am 15. 6. 1942.)

Classification of Coli-aerogenes Group. (I)

(pp. 1047~1057)

By Seiji TADA.

(Agricultural Chemical Laboratory, Tokyo Imperial University;
Received March 3, 1942.)

**On the Contents of Vitamin C of Harbaceous
Plants in Spring.**

(pp. 1058~1061)

By Hisayosi IWATA and Syoji TIBA.

(Morioka Imperial College of Agriculture and Forestry;

Received June 10, 1942.)

**On the Influence of Some Inorganic Catalysers
Upon the Carbondioxide Production
of White Rats.**

(pp. 1062~1064)

By Tetutarō TADOKORO, Tuneyuki SAITO, and
Jizō HASHIMOTO.

(Hokkaido Imperial University; Received June 9, 1942.)

On the Fixation of Sericin of Raw Silk. (Part VIII).

Ageing Phenomenon of Sericin-fixed Cocoon Fibres.

(pp. 1065~1069)

By Masami OKU, Tuneo KURASAWA, and Hitosi HAJIMOTO.

(From the Chemical Fibre Laboratory, Ueda Imperial College of Sericulture
and Silk Industry; Received July 7, 1942.)

On the Fixation of Sericin of Raw Silk. (Part IX).

Effect of Finishing Chemicals upon Fixation Degrees.

(pp. 1070~1072)

By Masami OKU and Tuneo KURASAWA.

(From the Chemical Fibre Laboratory, Ueda Imperial College of Sericulture and
Silk Industry; Received June 14, 1942.)

On the Studies of Diastase. I.

(pp. 1073~1081)

By Toyosaku MINAGAWA, Tetuichi KATAOKA, Sadatosi HAYAKAWA,
and Kenitiro FUKUMA.

(The Institute of Physical and Chemical Research;
Received June 26, 1942.)

Enzymatic Studies on Cereals. (Part XV.)

On the Maltase in Rice.

(pp. 1082~1086)

By Gohei YAMAGISI.

(Morioka Imperial College of Agriculture and Forestry; Received July 27, 1942.)

Aufschluss von Bagasse mit Ca-Sulfitverfahren.

(SS. 1087~1091)

Von M. SIKATA, I. TATI und N. URANO.

(Aus d. Agrikulturchem. Institut d. Universität Kyoto.

Eingegangen am 20. Juli 1942.)

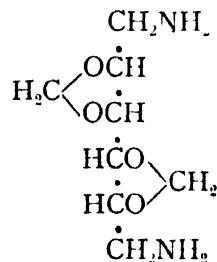
Diamino Sugars and their Filament Formation Ability. Preliminary Report. 1,6-Diamino-2,3,4,5-Dimethylene-mannitol.

(pp. 1092~1094)

By Yasuji HAMAMURA and Minoru OTUKA.

(Kyoto Sericultural College, Received July 18, 1942)

The authors succeeded in the synthesis of 1,6 diamino-2,3,4,5-dimethylene-mannitol from 1,6-dichlor-dimethylene mannitol⁽¹⁾ with conc. ammonia. This substance is syrup in ordinary temperature and distilled at 125~130° under 0.01 mm. $[\alpha]_D^{20} = +90.2^\circ$. It is soluble in water and alcohol, insoluble in ether, chloroform, benzene and other organic solvents. Its carbonate is fine crystalline plate, melting at ~160°. Hydrochloric acid, nitric acid and oxalic acid salts are also crystalline substances, but have no melting point. Mucic acid forms a crystalline salt with it in molar proportion, and the salt is decomposed at 210°. With saccharic acid it forms a salt with two mol saccharic acid monolactone.



In the present case, we have not yet succeeded in deriving polyamide from the latter two salts on account of the effect of their free hydroxyl groups, but we have a hope to produce a polymer by covering their hydroxyl groups.

(1) F. MICHEFL: *Ann.*, **496**, 77 (1932).

On the Influence of Soil Acidity and Exchangeable Lime Content for the Growth of Forest Trees. (Part II).

(pp. 1095~1100)

By R. KAWASHIMA and G. SUYAMA.

(Agr. Chem. Laboratory, Kyushu Imp. University; Received June 9, 1942)

Manufacture of Acetone and Butanol by Fermentation. (3).

(pp. 1101~1109)

By Ryuiti HATTORI

(Tokyo Imperial University; Received July 10, 1942)

Carbohydrates in Proteins. Parts 1~2.

1. Estimation of Carbohydrate in Silk.
2. Isolation of a Glucoside from Silk.

(pp. 1110~1116)

By Y. INOUE and Y. KUDO.

(Biochem. Lab., Dept. of Agriculture, Kyoto Imperial University;
Received June 29, 1942.)

Recently, the presence of carbohydrate residue as a constituent has been reported, not only in gluco- or muco-proteins, but also in the so called simple protein. Especially, in 1934, M. Sørensen tested many proteins by the extinction curve process and demonstrated the presence and kinds of carbohydrates in proteins. As regards the isolation of such sugar residues or their derivatives, S. Frankel, in 1927, obtained glucosaminemannobiose from egg-albumin, which P. A. Levene confirmed in 1929 and 1941, as glucosamine-mannose-mannose-trisaccharide. Rimington isolated the same sugar complex from ox serum in 1931 and Bierry, in 1934, obtained galactose-glucosamine-mannose from horse serum. Neuberger, Herwitt and Morgan also investigated along the same line. All of these researches, however, are confined to the determination of component sugar residues, not touching on the chemical constitution, and, moreover, nobody discussed the manner of linkage of sugar residues to peptides or amino acids which are the main constituents of the protein molecule.

The authors already isolated several glycosides from a number of proteins, all of which were N-glycosides of peptide or amino acids and those are now under investigation for the purposes of the determination of their constitutional formulae, including the manner of linkage, the arrangement of amino acid residues and kind of sugar residues. Besides it may be expected that some knowledge of their physiological meanings in proteins may also be obtained.

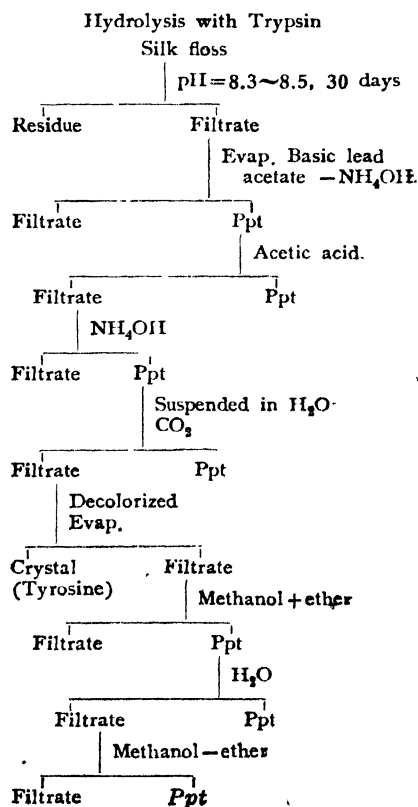
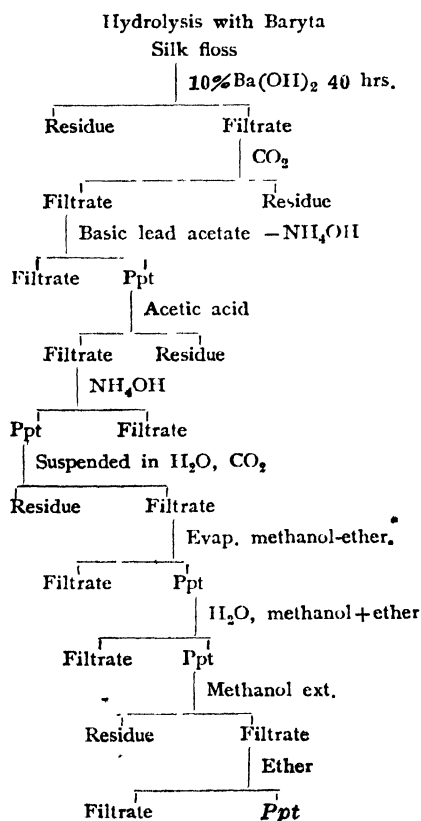
In the present paper, the estimation of carbohydrates as glucose in silk and the isolation and the determination of a new N-glucoside from silk protein have

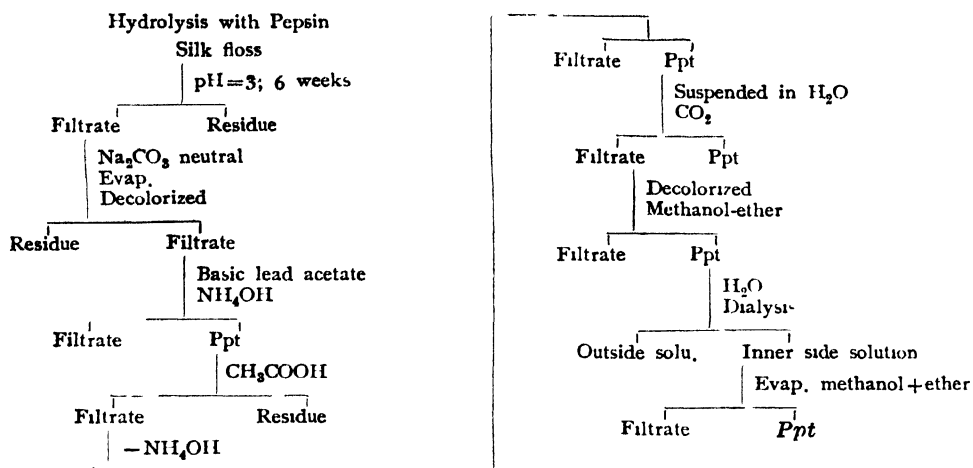
been described. The authors tested 18 kinds of silk cocoons and determined their sugar contents as glucose by means of the orcinol-sulphuric acid process, by which it was shown that the average value was 1.46% as described below. And from the fact that the purified fibroin contains only 0.3% of glucose, it could be seen that the most part of carbohydrate residues would predominate in the sericin layer.

| | | |
|-------------------|--------------------|-------|
| European species | average of 3 kinds | 1.35% |
| Japanese " | " " 5 " | 1.51 |
| Chinese " | " " 3 " | 1.49 |
| Hybrid " | " " 7 " | 1.61 |
| Univoltine " | " " 7 " | 1.43 |
| Bivoltine " | " " 4 " | 1.50 |
| Total average | | 1.46 |
| Tensan-cocoon | 0.83% | |
| Sakusan-cocoon | 1.09 | |
| Silk-floss (keba) | 2.40 | |
| Fibroin | 0.30 | |

The value in sericin is too indefinite to define, perhaps owing to the methods of collecting or refining of sericin from cocoons, for instance, ranging from 2.40% to 5.83%.

The authors hydrolysed raw silk with baryta, trypsin and pepsin separately, using silk floss as main raw material. The procedures were simply tabulated as follows:

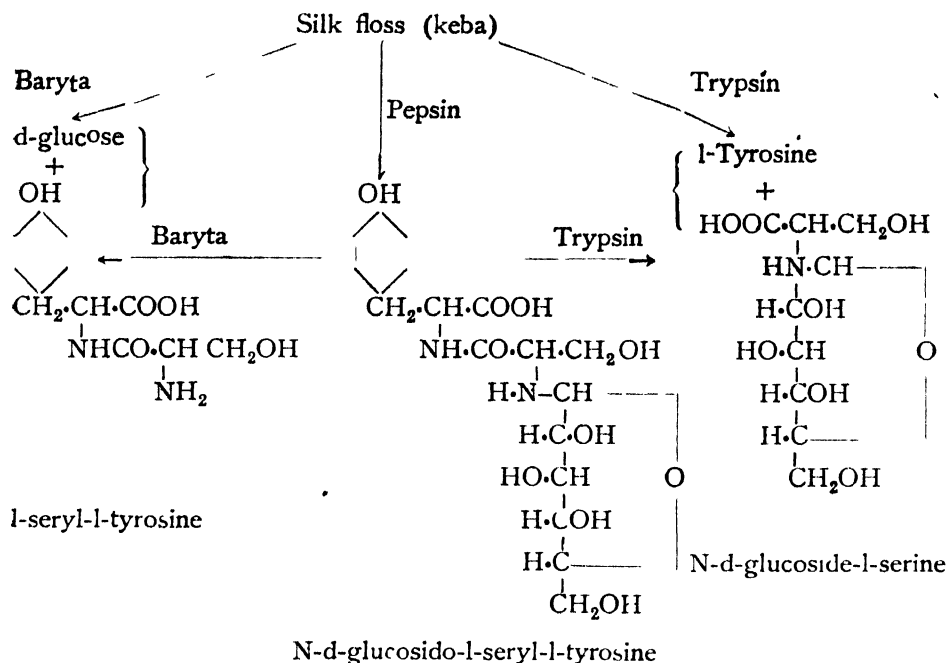




The product obtained by baryta-hydrolysis was hygroscopic powder and showed positive reaction to Millon and Ninhydrin tests but negative to Molisch. By hydrolysing further with 25% sulphuric acid, it was shown to consist of l-tyrosine and l-serine, of which β -naphthalene-sulfonyl derivative, m. p. 214°C , was identified. Subsequently the hydrolysis of the naphthalene-sulfonyl derivatives of this dipeptide proved to be l-seryl-l-tyrosine.

By hydrolysis with trypsin, the authors isolated white hygroscopic powder which have Molisch and Ninhydrin reactions but not Millon's, and were non-reducible to Fehling solution until boiled for about 2 hrs. With 5% HCl, l-serine and d-glucose were obtained as decomposition products, glucose as osazone, m. p. 204° – 205° , and serine as β -naphthalene-sulphonyl-serine, m. p. 214° . Accordingly the above product should be considered as a serine glucoside and was determined to be N- rather than O-glucoside from the fact that, in the authors' laboratory, Dr. Onodera is now investigating systematic synthesis of amino acid glucosides in which the different behavior of N-glucoside and O-glucoside to baryta solution was observed; O-glucosides being very stable to baryta while N-glucosides are unstable. and also the manner of the coloration by Ninhydrin reagent is distinctly different between the two glucosides: O-glucoside indicates the colour change spontaneously while N-glucoside displays it slowly after warming. Therefore, the hydrolysate by trypsin was concluded to be l-serine-N-d-glucoside.

By pepsin, white hygroscopic powder obtained was negative to Biuret but positive to Molisch, Ninhydrin and Millon and non-reducing. As the result of further hydrolysis with 25% H_2SO_4 , l-tyrosine, l-serine and d-glucose were identified and it was shown that the hydrolysate by pepsin was N-d-glucosido-l-seryl-l-tyrosine, because, when the hydrolysate was further decomposed either with trypsin or with baryta, the same products as those obtainable by the direct decomposition of silk floss were always identified.



Although Abderhalden recognized, in 1932, the presence of glucosamine and glucuronic acid residues in silk protein, the authors failed to isolate a complex containing such a group in spite of their careful investigation.

On the Chemical Studies on Baggasse Pulp. (11)

(pp. 1117~1118)

By Tetutaro TADOKORO, Takesi SASAKI, and
Masao NISIDA.

(Hokkaido Imperial University; Received June 11, 1942.)

Untersuchungen über die Beziehungen von Bataten zur Alkoholprodukten. (VII).

(SS. 1119~1122)

Von K. SUEMATU, M. UTIKOSI und T. MATUMURU.

(The Institute of Reserch on Chemical Industry, Government-General of Taiwan, Nippon,
Received June 24, 1942.)

On the Acid Fermentation of *Aspergillus Niger*. Part III.

The Formation of Citric, Glutaric and Glutaconic
Acids and Mannitol from *l*-Xylose.

(pp. 1123~1126)

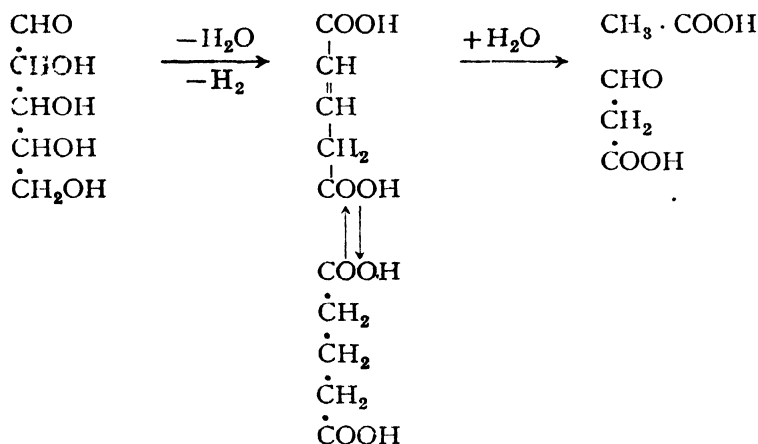
By Sinitiro BABA and Kinichiro SAKAGUCHI.

(Agricultural Chemical Laboratory, Tokyo Imperial University,

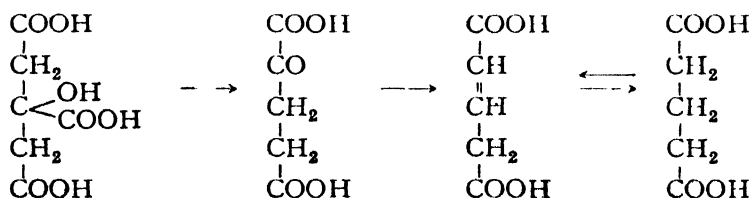
Received June 24, 1942.)

Citric, glutaric and glutaconic acids and mannitol have been confirmed on products of *l*-xylose metabolism of *Asp. niger* var. No. 2, a citric acid former, and *Asp. niger* var. No. 25, a gluconic acid former.

The mechanism of the formation of the C₅-dicarboxylic acids might be assumed in two ways. If the direct conversion of *l*-xylose to those acids is possible, the reaction may take place in accordance with the following equation, glutaconic acid being assumed as an intermediate in the further breakdown of the pentose,



Since, however, the high rates of citric acid production from *l*-xylose by the authors' organisms have been confirmed, the possible conversion of citric acid to those C₅-dicarboxylic acids might also be assumed.



The biological production of α -ketoglutaric acid from citric acid has already been reported by Martius⁽¹⁾ and Tada⁽²⁾.

LITERATURE.

- (1) MARTIUS: *Zeit. physiol. Chem.*, **247**, 104 (1937).
- (2) TADA: *This Journal*, **17**, 569 (1941).

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

On the Acid Fermentation of *Aspergillus niger*. Part IV.

(pp. 1127~1130)

By Kinichiro SAKAGUCHI and Sinitiro BABA.

(Agricultural Chemical Laboratory, Tokyo Imperial University ;

Received July 8, 1942.)

SUMMARY.

1. In the presence of methylene blue, remarkable quantities of aconitic acid have been accumulated in the metabolism solution of *Asp. niger*, which contained glucose as the sole source of carbon.

2. When the mixed solution of the sodium salts of aconitic and citric acids is fermented by *Asp. niger*, about 90% of the former added is converted to the latter, while the addition of 1/1000 mol of methylene blue to the solution inhibits the conversion completely.

3. Aconitic acid was also produced by *Asp. niger* in the mixed solution of the sodium salts of *d,l*-malic and acetic acids in the presence of methylene blue.

4. On the basis of the facts obtained it may be concluded that aconitic acid is the direct precursor of citric acid in the fermentation of glucose by *Asp. niger*, the former acid being probably synthesized from acetic acid and C_4 -dicarboxylic acid as malic acid.

Classification of Coli-aerogenes Group. (II)

(pp. 1131~1140)

By Y. TADA.

(Agricultural Chemical Laboratory, Tokyo Imperial University ; Received March 3, 1942.)

Studies on Seed Disinfection. (Parts 1~2).

I. Influence of $C_1 \sim C_5$ Alkyl Mercuric Chlorides on the Germination of Unhulled Rice.

II. Disinfecting Action of $C_1 \sim C_5$ Alkyl Mercuric Chlorides on Certain Fungi and Bacteria.

(pp. 1141~1148)

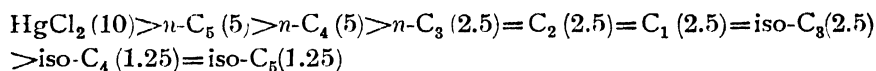
By Y. INOUE and G. SHINTANI.

(Biochem. Lab., Dept. of Agriculture, Kyoto Imperial University;

Received July 23, 1942)

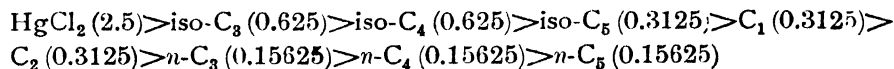
Although the disinfection of grain is now a well established principle of plant hygiene, little systematic investigation, especially on a relationship between fungicidal or bactericidal properties and chemical composition, is available in the literature.

In the present work, methyl, ethyl, propyl, butyl and amyl mercuric chlorides were synthesized by means of the addition of mercury halide to dialkyl mercury or by the reaction of mercury halide to Grignard's solution, and their fungicidal and bactericidal powers were tested by the technique which the authors elaborated for a laboratory testing of fungicidal or bactericidal value, effect on germination of seeds being investigated at the same time. Furthermore, they were compared to $HgCl_2$ solution of the same Hg concentration and also to formaldehyde solution. Isopropyl, isobutyl and isoamyl mercuric chlorides were also synthesized and were compared with their corresponding normal compounds. In conclusion, with regards to *Piricularia oryzae*, air dried unhulled rice being employed which was previously sprayed with water suspension of conidia of the fungi, the maximum safety concentration (dosis tolerata) for germination was observed in the following order:—



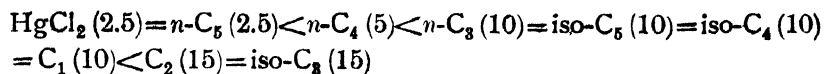
(The figures in brackets indicate Hg amount; mg per litre.)

The minimum fungicidal concentration (dosis curativa) for the germination of spores of *Ophiobolus miyabeanus* was also observed in the following approximate order:—



It is concluded that the higher alkyl compound in normal series as fungicide is highly valuable, and iso-compounds are generally inferior to the corresponding normal forms. And it is remarkable that the authors' results are contrary to Weston and Boorer's view, according to which the lower alkyl radicals are the more valuable as fungicides.

The authors also performed tests on *Bacillus coli* and the minimum bactericidal concentration (dosis curativa) was observed as follows:—



From these results, it may be very interesting that HgCl_2 was shown as the most powerful bactericide, while, as fungicide, HgCl_2 is never superior to the organic mercury compounds.

Formaldehyde as fungicide for unhulled rice was proved to be useful only in the concentration of between 0.5 and 0.1% ; in higher concentration germination may be spoiled and in lower concentration disinfection is not very effective.

Abnormal germination, as when colchicine is used, was also observed by using certain alkyl mercury halides as fungicide and their behaviours are now under investigation.

On the Seeds of "Sasa."

(pp. 1149~1152)

By Hisayosi IWATA and Mohatiro NAKAZIMA.

(Morioka Imperial College of Agriculture and Forestry; Received July 29, 1942.)

The seed grains of several species of "Sasa" contained about 12% of protein, 75% of carbohydrates, 56% of starch, 7% of pentosan and 4% of dextrin. The protein was composed of about 40% of insoluble, 25% of glutelin, 13% of prolamin, 8% of albumin and globulin, and 13% of non-protein forms.

On the Influence of Soil Acidity and Exchangeable Lime Contents for the Growth of Forest Trees. (Part II.)

(pp. 1153~1158)

By R. KAWASHIMA and G. SUYAMA.

(Agr. Chem. Laboratory, Kyushu Imp. University; Received July 8, 1942.)

On the Dehydrogenase Action in the Sliced Brain Tissue of the Rat. II.

(pp. 1159~1160)

By Tetutaro TADOKORO and Dizo HASHIMOTO.

(Hokkaido Imperial University; Received June 5, 1942.)

**Studien über die Bildung des Wasserstoffperoxyds
im lebenden Organismus**

(SS. 1161~1166)

Von K. YAMAFUJI, M. FUJII und F. YOSHIHARA.

(Aus dem Agrikulturchemischen Institut der Kaiserlichen Universität in Fukuoka;

Eingegangen am 4. 11. 1942.)

On the Studies of Diastase. II.

(pp. 1167~1171)

By Toyosaku MINAGAWA, Tetuiti KATAOKA, Sadatosi HAYAKAWA,
and Kenitiro FUKUNA.

(The Institute of Physical and Chemical Research;

Received June 26, 1942.)
